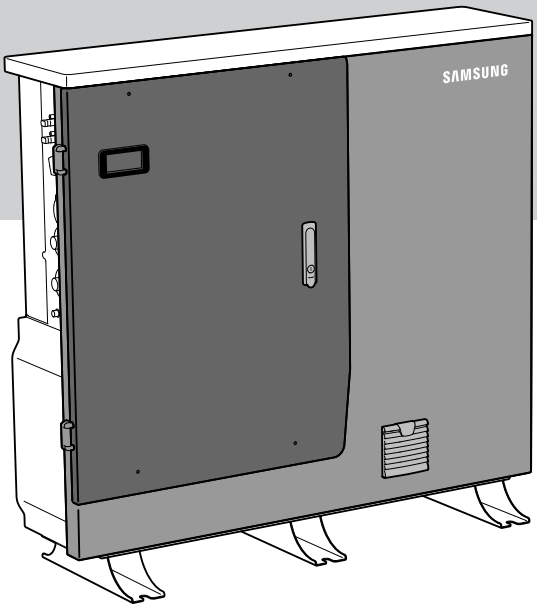
SAMSUNG SDI

ELSR722-00004 / ELSR103-00001
Scalable All in One
Installation Manual



ELSR722-00004: Battery Tray (ELPT362-00004) x 2
ELSR103-00001: Battery Tray (ELPT362-00004)x 3

CAUTION

- Use this product only at home.
- Do not operate with other components not approved by the ESS systems.
  (Connecting other products in parallel to Samsung SDI's products may result in abnormal operation.)
- The internet connection is required to use all functions of the ESS system.
- If you have a problem, please contact the installer.
- The Specifications of the product may be modified without prior notice to improve product quality.

CAUTION

1. Read the manual and all other available information.
2. Attend Samsung installation training course/s. This course/s is recommended before the distributor provides an ESS.
3. Register as a Samsung installer.
4. Be compliant with CEC accreditation requirements for grid connect systems with batteries, which currently requires off-grid installation accreditation.
5. Visit the installation site prior to quoting.
6. Check that the switchboard has room, or is suitable for, additional connection/s (e.g. external meter for ESS 3.6 model).
7. Be aware of Dangerous Goods Class 9 regulations for transport, storage and handling of lithium batteries.
8. Be aware of Building Code regulations for battery installations.
9. Read the manual again.
10. Ensure you have the latest version of the installation manual, which can be downloaded from your distributor's website.

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1. About this Manual

1.1 Valid Range

This is the installation manual for the Scalable (7.2 kWh/10.8 kWh) All in One system. Please read this installation and user manual carefully before installing and operating the scalable all in one system.
It contains important safety instructions. The warranty will be void if you fail to follow the instructions in this manual.

1.2 Target Group

This installation manual applies only to the Samsung Scalable All in One.

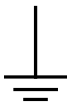
1.3 Manual Storage

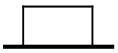
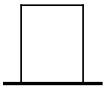
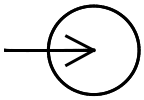
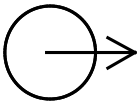
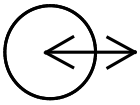
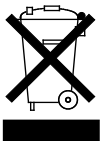
The user manual and installation manual can be downloaded from the product download section at "https://myess.samsungsdi.com". The specifications of the product can be changed for improvement without notice.

Also, the software can be updated automatically without notice over the Internet.

1.4 Symbols Used

Symbols	Meaning
	CAUTION This symbol indicates a hazardous situation which could result in a light injury, if not avoided.
	NOTICE This symbol indicates a hazardous situation which could result in damage to the property, if not avoided.
	Information This symbol indicates valuable tips for optimum installation and operation of the product.

Number	Symbol	Description
1		Direct current
2		Alternating current
3		Both direct and alternating current
4		Three-phase alternating current
5		Three-phase alternating current with neutral conductor
6		Earth terminal
7		Protective conductor terminal
8		Frame or chassis terminal
9		Refer to the operating instructions
10		On (supply)
11		Off (supply)
12		Equipment protected throughout by double insulation or reinforced insulation
13		Caution: Risk of Electric Shock
14		Caution: Hot Surface

Number	Symbol	Description
15		Caution: Risk of Danger
16		In position of a bi-stable push control
17		Out position of a bi-stable push control
18		Input terminal or rating
19		Output terminal or rating
20		Bidirectional terminal rating
21		Caution: Risk of Electric Shock and Energy Storage Timed Discharge
22		Caution: Risk of Hearing Damage and Wear Hearing Protection Wear hearing protection
23		Do not dispose of the inverter with household wastes. For further information on disposal, refer to the installation manual provided.
24		The CE Indication: The relevant equipment complies with the requirements in the EC guidelines.
25		Caution: Risk of Electric Shock and wait at least 5 min after power turn off when opening the product.

[Table 1-1: Symbol Description]

2. Safety

2.1 Intended Use

NOTICE

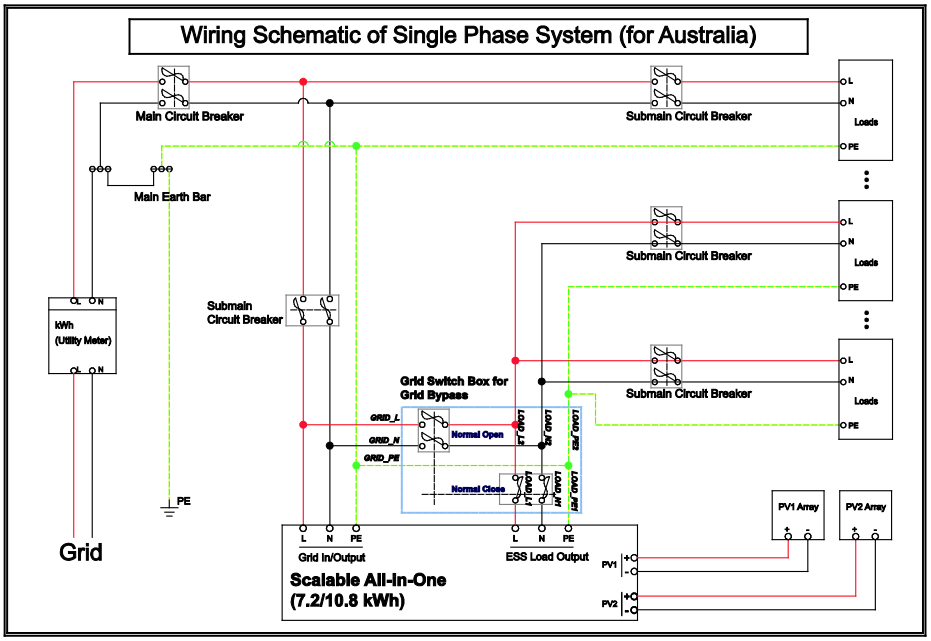
The Scalable All in One system is intended for residential use only.

The Scalable All in One system should not be used for commercial or building.

The Scalable All in One system is designed for residential use. It is a single-phase, grid-connected system of solar energy sources and Li-Ion Battery energy storage.

The Scalable All in One system uses solar energy power connected to the input/output terminal installed on the side of the device in order to:
1) charge the Li-Ion battery energy storage,
2) provide a supply to the household load, and
3) convert direct current (DC) electricity of the battery to alternating current (AC) to discharge as household single-phase load or electric system.

This device should not be used for any purpose other than the purpose described in this installation manual. Any substitute use of this device, random change in any of its parts, and use of components other than sold or recommended by Samsung SDI will nullify the product's guarantee. For example, Samsung Li-Ion battery energy storage should not be replaced by other manufacturer's battery storages. For further information on proper use of this device, contact the Samsung SDI Service line or visit at "www.samsungsdi.com".



[Figure 2-1: Connection Diagram]

2.2 Safety Precautions

CAUTION

High voltages in power conditioning circuits. Lethal hazard of electric shock or serious burns.

All work on the PV modules, inverters, converters, and battery systems must be carried out by qualified personnel only.

Wear rubber gloves and protective clothing (protective glasses and boots) when working on high voltage/high current systems such as INVERTER and battery systems.

CAUTION

Li-Ion battery energy storage system (ESS) inside. When assembling the system, do not intentionally short the positive (+) and negative (-) terminals with metallic object.

All work on the ESS and electrical connections must be carried out by qualified personnel only. The ESS within Scalable All in One provides a safe source of electrical energy when operated as intended and as designed.

A potentially hazardous circumstance such as excessive heat or electrolyte mist may occur due to improper operating conditions, damage, misuse and/or abuse. The following safety precautions and the warning messages described in this section must be observed. If any of the following precautions are not fully understood, or if you have any questions, contact Customer Support for guidance (see chapter 13).

The safety section may not include all regulations for your locale; personnel working with Scalable All in One must review applicable federal, state and local regulations as well as the industry standards regarding this product.

CAUTION

This product is intended to be used for PV source inputs and residential home grids (AC 230V). If not used as intended, the protection provided by the equipment may be impaired.

CAUTION

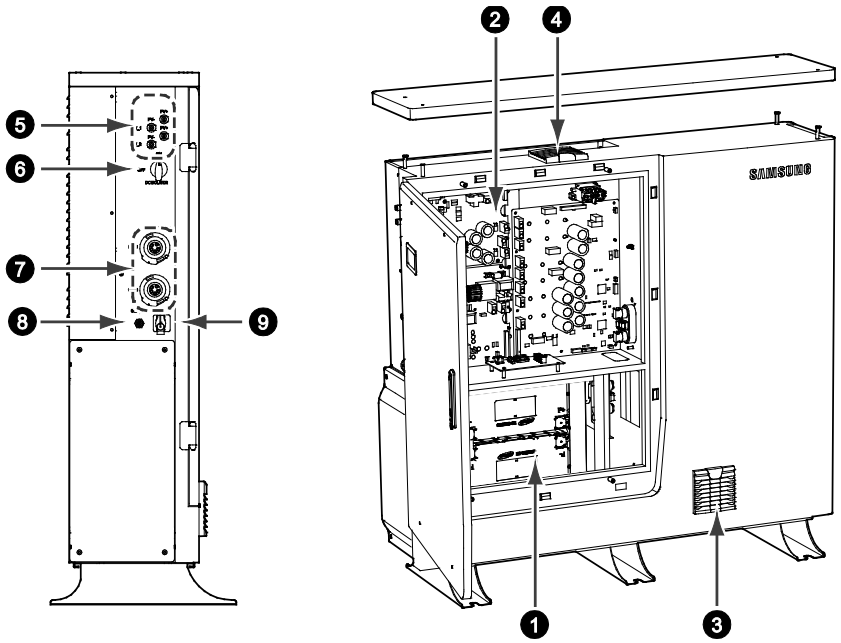
This device is designed appropriate for two-PV string structure. Therefore, the PV string 1 and PV string 2 must be connected to PV input 1 and PV input 2, respectively.

Do not split one PV string output for connecting it into the PV input terminal 1 and input terminal 2.

2.3 Product Overview

The All in One system includes the PV inverter, battery charger/discharger, Li-Ion battery, and EMS.

The basic operating modes consist of PV generation mode, PV generation + charge/discharge mode. The operation mode of this product is automatically determined by the EMS algorithm.



[Figure 2-2: Part View of Samsung All in One]

No.	Description
1	Lithium Ion battery
2	INVERTER & Converter (PV inverter and battery charger / discharger)
3	Air Filter1 (Bottom)
4	Air Filter2 and FAN (Top)
5	Input terminal (MC4-2set)
6	DC isolator
7	Grid and Load connector (RST50i5S connector)
8	Service Connecter for Installation
9	Communication (LAN)

[Table 2-1: Part Description]

2.3.1 Basic Specifications

PV Generator Data (DC)		
Max. input total power	6.6 kWp	
Max. input power per string	3.3 kWp	
Max. input voltage	550 V	
Min. input voltage/Initial input voltage	125 V/150 V	
MPPT voltage range	125 V~500 V	
Max. input current per string	15 A	
Number of independent MPP trackers	2	
Battery Data (DC)		
System model No.	ELSR722-00004	ELSR103-00001 (*)
Battery rated capacity	7.2 kWh	10.8 kWh
DOD (Depth of Discharge)	90 % (6000cycles, 5 ~ 95 %),	
Battery voltage range/nominal voltage	96 ~ 132 V / 120 V	145 ~ 198 V / 180 V
Battery Max. current	46 A	38 A
Battery DC/DC Converter Data		
Rated power	4.0 kW	4.98 kW
Grid Connection Data (AC)		
Rated power	4.98 kW	
Max. apparent AC power	4.98 kVA	
Max. output current	22 A	
Max. input AC power	8 kW	
Max. allowed current for fuse protection	43 A	
Nominal AC voltage/range	230 V/200 V~270 V	
Rated power frequency	50 Hz	

(*):2 battery trays for 7.2 kWh; 3 battery trays for 10.8 kWh

[Table 2-2: Basic Specifications]

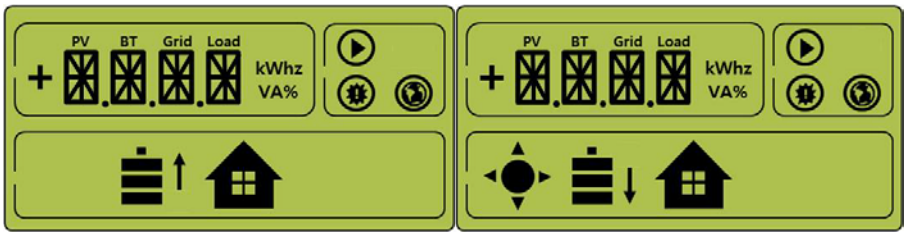
2.3.2 Grounding the PV Inverter

The PV inverter complies with the local requirements for grounding the PV inverter. Samsung SDI recommends connecting and grounding the PV inverter's frame and other electricity conducting surfaces in such a way that there is continuous conduction in order to achieve maximum protection for systems and persons. And the PV inverter's DC (+) pole and DC (-) pole are not permitted to be grounded.

2.3.3 Fail-safe actions upon power failure

When a system outage occurs, the utility pole in the following figure disappears and it switches to the backup mode after 20 seconds to supply power. With 7.2 kWh, the supplied power is a maximum of 4 kW and with 10.8 kWh, a maximum of 4.98 kW.
The back mode is canceled in 5 minutes after return to normal operation.

The utility pole appears when power is supplied to the system. Upon system outage, it disappears. Upon PV generation, the sun mark appears.



[Figure 2-3: Back up mode (LCD)]

Under DOD 90% and 95% of battery to loads, the 7.2 kWh system can operate for approx. 92 minutes and the 10.8 kWh system for approx. 110 minutes.

System	Battery capacity	Battery energy	Load	Hour	Min
7.2 kWh	7.2 kWh	6.48 kWh	4 kWh	1.5	92.3
10.8 kWh	10.8 kWh	9.72 kWh	4.98 kWh	1.8	110.8

[Table 2-3: Maximum Outage Response Times for each System with Battery Full]

NOTICE

The outage response time may vary depending on the battery capacity and loads.

3. Package Removal and Inspection

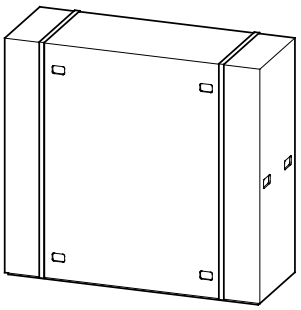
	CAUTION
	Included in this box are a battery and printed circuit board, and the entire weight amounts to 105 kg. Therefore, special care must be taken in handling. Make sure to have at least two persons deliver with something like trolleys and remove the package.

3.1 Package Removal and Tray Assembly

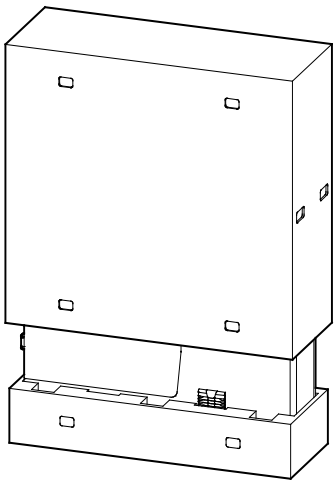
3.1.1 Removing the Enclosure Package

As shown in the figure in this section, remove the package components from the enclosure in the following order.

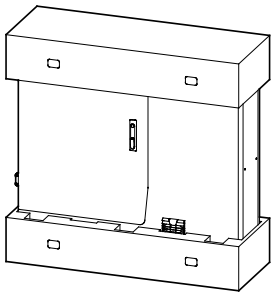
1. Place the system on the installation location.



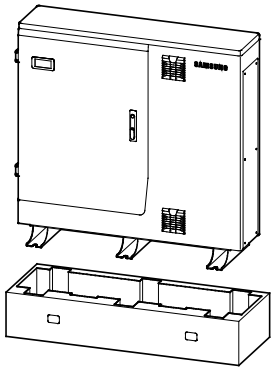
2. Open the upper part of the system case.



3. Remove top side of the cover in the front of the product.



4. Open the side support on the bottom.



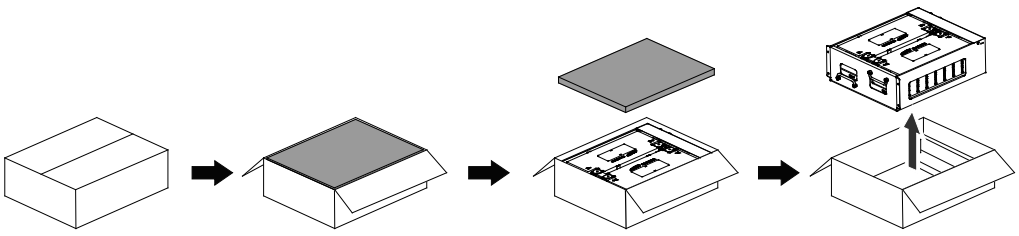
[Figure 3-1: Process for the enclosure package removal]

3.1.2 Removing the Battery Tray Package

As shown in the [Figure 3-2], remove the package for the battery tray.

1. Open the box cover of the product.
2. Remove the buffers with a straight pull.
3. Take out the battery tray by grabbing the handle and pulling it up.

Note: The tray weighs approximately 45 kg, so make sure to have at least two persons lift it.

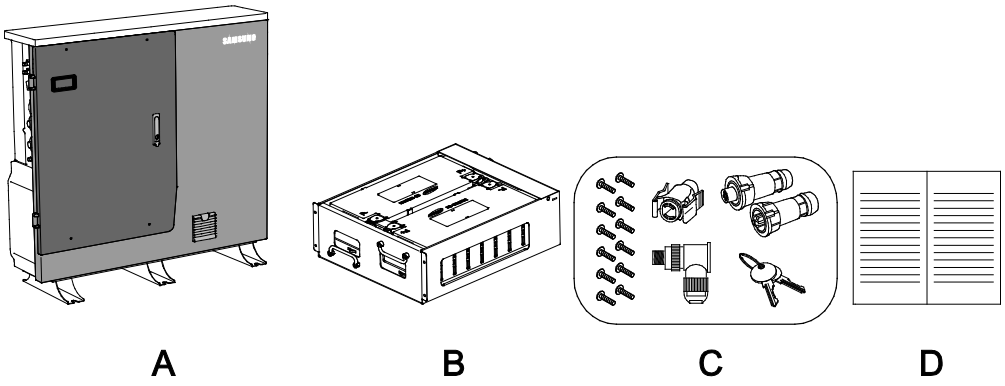


[Figure 3-2: Process for the battery package removal]

3.1.3 Checking Components on the Packing List

Once the product has been delivered, refer to the figure [Figure 3-3] and [Table 3-1], identify the entire components included in the package and the correct number of the quantity listed in the table.

Packing List



[Figure 3-3: Packing List]

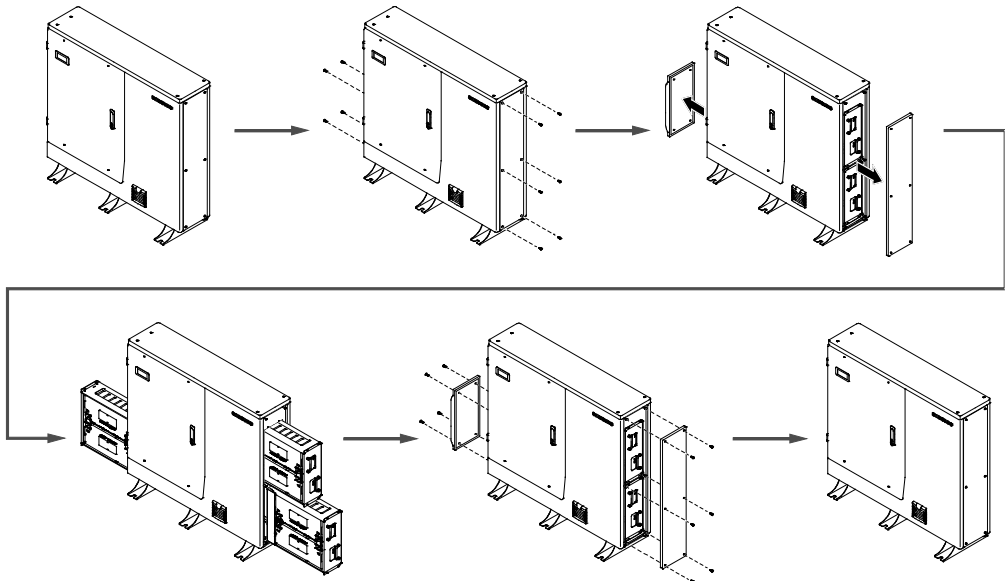
Object	Part Name	Code No.	Quantity
A	INVERTER ASSY	SJ94-00146A or SJ94-00147A	1
B	TRAY ASSY	ELPT362-00004	2 or 3(*)
C	1. SCREW(M4xL8) 2. LAN Connector 3. GRID Connector 4. LOAD Connector 5. Service Connector 6. DOOR KEY	6001-002698 VS-08-T-H-RJ45/IP67 97.051.4253.1 97.052.4253.1 A366-CP-T0651	12 1 1 1 1 2
D	Installation Quick Guide Manual	SJ68-02142A	1

(*):2 battery trays for 7.2 kWh system; 3 battery trays for 10.8 kWh system

[Table 3-1: Component Description]

3.1.4 Assembling the Battery Tray

The [Figure 3-4] shows the assembly process for the battery tray. Refer to Clause 5.4 and assemble the battery tray as described in it.



[Figure 3-4: Process for the battery assembly (For 10.8 kWh System)]

3.2 Checking for damage in Delivery

When opening the box that contains Samsung Scalable All in One system in it, check for any possible damage caused in transit and ensure the correct number of the components therein. If there is a scratch on the enclosure, contact your local dealer for inspection and service.

3.3 Identifying Samsung Scalable All in One

Attached on the enclosure of this product is the Type Label where the identity of this product is described. For safe usage, make sure that the following product information is indicated on the Type Label.

- Product Name
- Device Type (Model)
- Serial Number (Serial No.)
- Device-specific characteristics
- Certification Lists
- Warnings and Notification

The model No. of All in One system is defined as below.

- ELSR722-00004
  - ELSR: Residential application
  - 72: Battery capacity (x0.1 kWh, Less than 10 kW)
  - 2: Battery capacity group
  - 00004: product line number
- ELSR103-00001
  - ELSR: Residential application
  - 10: Battery capacity (x1 kWh, More than 10 kW)
  - 3: Battery capacity group
  - 00001: product line number

The model No. of INVERTER (power conditioning system) is defined as below.

- SJ94-00146A
  - SJ: battery for ESS
  - 94: Ass'y
  - 00146: product number
  - A: National Code (Australia)

The Type Label is shown in the [Figure 3-5].

SAMSUNG SDI

Model Name : Scalable All-in-One
Inverter No. : SJ94-00146A

5min.

Serial No.

DC Photovoltaic Module Input	Max. Voltage	550V	
	MPPT Range	125V ~ 500V	
	Max. PV Current Per String/$I_{SC\ PV}$	15A / 20A	
AC (Input)	Normal Voltage (Vac)	230	
	Nominal Frequency (Hz)	50	
	Max. Continuous Current (A)	35	
Load	Normal Voltage (Vac)	230	
	Nominal Frequency (Hz)	50	
	Normal Active Power Pn (kW) (AC Input + Inverter rating)	8	
AC (Output)	Normal Voltage (Vac)	230	
	Normal Frequency (Hz)	50	
	Max. Continuous Current (A)	22	
	Normal Active Power (kW)	4.98	
	Power Factor	0.8un ~ 1 ~ 0.8ov	
Battery (Input/ Output)	Battery Type	Li-Ion	
	Battery Capacity (kWh)	7.2	10.8
	Max. Continuous Current (A)	46	38
	Nominal Voltage (V)	120	180
Protection Degree / Class		IP54 / I	
IEC 62109-1/-2, AS62040.1.1, AS4777.2(3), IEC62619, IEC60730-1 Annex H, IEC61000-6-2/-3, IEC61727, IEC62116			

[Figure 3-5: Name Plate]

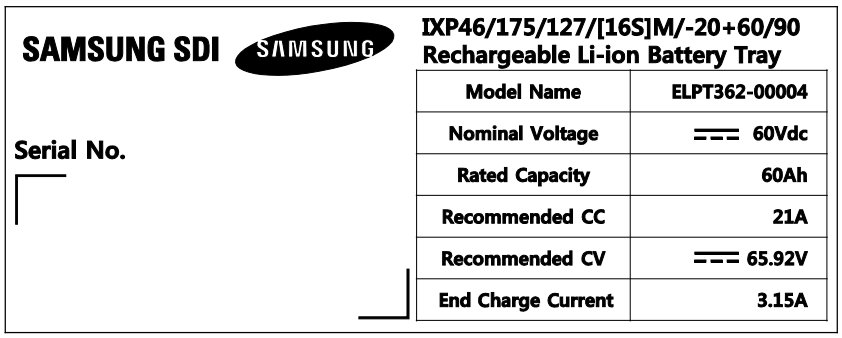
The product serial number is defined as below

■ AR00500108Z11510300001C

- AR: Residential Type
- 0050: Output power of inverter (x0.1 kW) *
- 0108: Capacity of battery (x0.1 kW)
- Z1: Factory Line
- 151030: Production date (YY-year, M-month, DD-day)
- 0001: Production order per day (001 ~ 999)
- C: National Code (Australia)

(* It was rounded off. (e.g. 4.98 → 5.0))

The Battery Tray Label is shown in the [Figure 3-6].
The number of Battery Tray is normally not matched inverter's one.
It is finally coupled when installing



[Figure 3-6: Battery Tray Label]

The battery tray serial number is defined as below

■ ET361A14709000X

- ET: Tray type
- 36: Capacity of tray (under x0.1 kW)
- 1A: Factory Line
- 14709: Production date (YY-year, M-month, DD-day)
- 0001: Production order per day (0001 ~ 9999)
- X: Grade of Cell

4. Installation

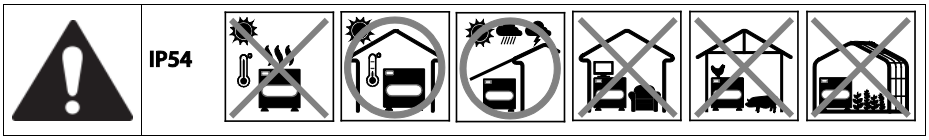
4.1 Selection of Installation Location

	CAUTION Danger to life due to fire or explosion! Danger to life due to high voltages! Despite careful construction, a fire can occur with electrical devices. Do not install the Scalable All in One on the following locations: On flammable construction materials; In potentially explosive areas; and In areas where highly flammable materials are stored!

	CAUTION Li-Ion battery energy storage is equipped within Scalable All in One. The ESS within Scalable All in One provides a safe source of electrical energy when operated as intended and as designed. A potentially hazardous circumstance such as excessive heat or electrolyte mist may occur due to improper operating conditions, damage, misuse and/or abuse. The following safety precautions and the warning messages described in this section must be observed. If any of the following precautions are not fully understood, or if you have any questions, contact Customer Support for guidance. The Safety Section may not include all regulations for your locale; Personnel working with 7.2/10.8 kWh All in One must review applicable federal, state and local regulations as well as the industry standards regarding this product.

	CAUTION All work on the ESS and electrical connections must be carried out by qualified personnel only.

4.1.1 Possible locations for installation



Selecting an optimal installation location for the ESS is required for operation safety, efficiency and life of the product.

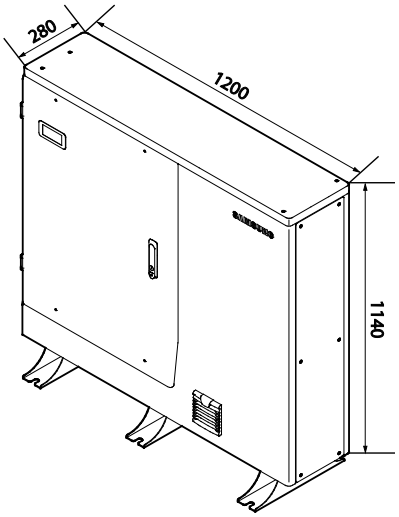
1. This IP54 product is recommended to be installed indoor. If it is required to be installed outdoor, the place must have a roof to avoid direct sunlight, rain and snow.
2. Install the product in a well ventilated and clean area with no dust or insects. (e.g. stockyards and carpets are not allowed).
3. Do not install the product in an area prone to floods or a high humidity area.
4. Do not install the product where a fire or explosion might occur.
5. Install the product in a place that is not exposed to corrosive gases (e.g. ammonia, acid, salinity content, etc.).
6. Install the product in a place where children cannot reach.
7. Install the product considering the noise level because noise is generated during operation, which may cause discomfort. (e.g. near a bedroom)
8. The floor must be hard so that it can withstand the weight and vibration of the product. (e.g. concrete structure)
9. The floor must not be sloped or recessed where a pool of water may form. If this is an issue, adjust the height of the floor to be at a higher point.
10. The floor surface must be fixed with anchors.
11. Do not install the product on flammable material. Flammable materials must not be placed within a specific distance.
12. Objects must not be stacked on top of the product.
13. After connecting all the cables, make sure that they are firmly inserted.

4.1.2 Storing the ESS system

1. The product must not be tilted when being moved. It must be lifted vertically.
2. The product must not fall from a height of 10 cm or more.
3. Make sure the product does not get wet in the rain or snow.
4. Do not stack the products on top of each other.

4.1.3 Dimensions and Weight

Once the 7.2/10.8 kWh All in One system has been assembled, its dimension is 1140 x 1200 x 280 mm, and its weight is approximately from 194 kg (7.2 kWh) to 239kg (10.8 kWh).
The [Figure 4-1] and [Table 4-1] show the outer dimensions and the weight of the device after assembly, respectively.



[Figure 4-1: Dimension of All in One]

System	Battery	Inverter (Include case)	Total
7.2 kWh	90 kg	104 kg	194 kg
10.8 kWh	135 kg	104 kg	239 kg

[Table 4-1: Weight of All in One]

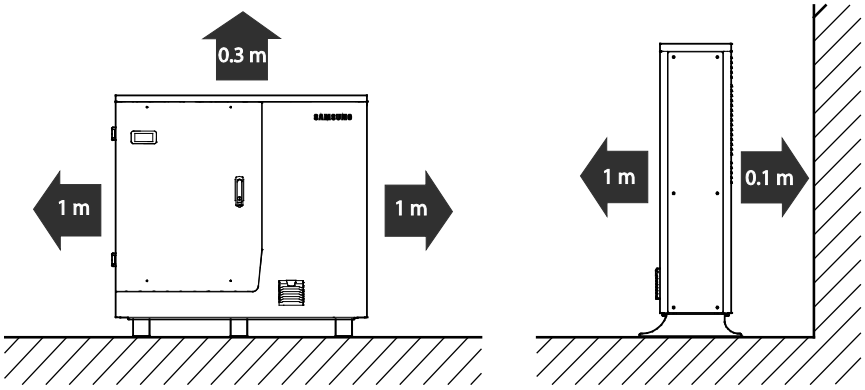
4.1.4 Ambient Conditions and Temperatures

Identify a proper installation location to install and remove the device easily at any time. This device must be located within reach distance.

The ambient temperature of the installation location will range from -10°C to +40°C.

4.1.5 Minimum Clearance

This device is required to maintain a minimum clearance distance for the safe installation of the product. Refer to the [Figure 4-2] to secure enough space and keep a distance of 0.1 m from the wall, 1 m in the front of the device, 1 m on both sides, and 0.3 m on top.

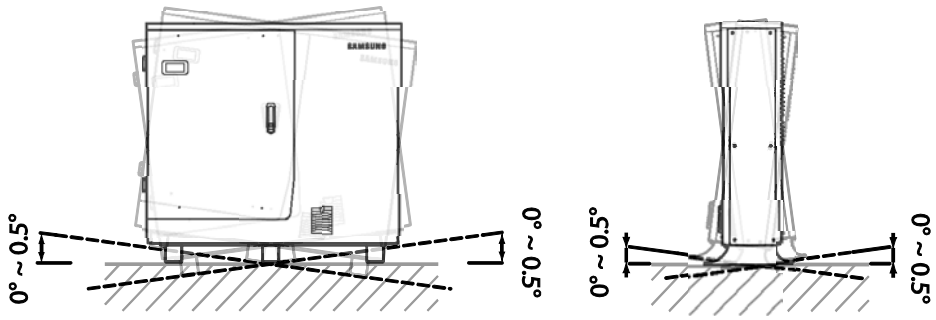


[Figure 4-2: Minimum Clearance for All in One]

4.1.6 Position (Location Selection)

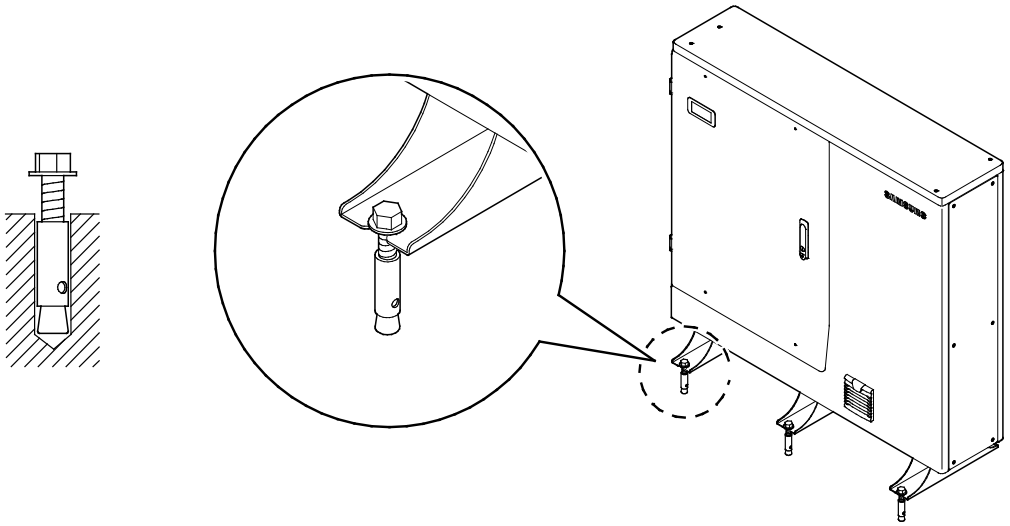
As shown in the [Figure 4-3], install the device on a flat surface. (Front, back, left, right gradient within ±0.5°)

To allow for natural ventilation, the side of the system must be kept away from the wall about 0.3m at least. Make sure not to have foreign substances and objects stuck in the blowing fan, ventilation entrance and exit sides.

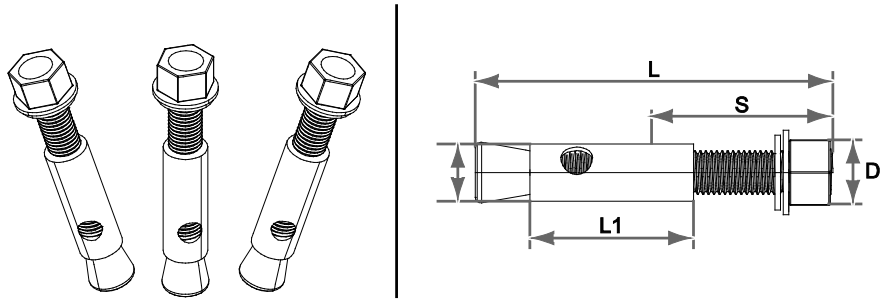


[Figure 4-3: Restriction for the surface gradient]

4.2 Mounting Instructions



[Figure 4-4: Spanner for fastening anchor nuts (Minimums 4ea)]



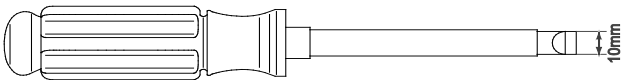
[Figure 4-5: Anchor Bolt]

Screw name	L	S	D	L1	Drill Used	Drill depth (Min.)	Tensile capacity (Max.)	Shear Capacity (Max.)
1/2 (M12)	100	60	17	50	17	55 (mm)	3,200 (kgf)	3,400 (kgf)

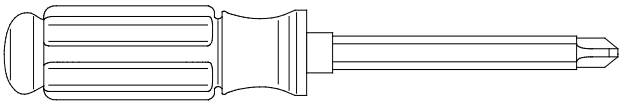
[Table 4-2: Specifications for anchor bolt]

1. Select the drill proper for specifications for drilling specifications.
2. Remove the dust from the hole, then separate the nut and the washer to insert both the bolt and the cap.
3. Set the product in place, assemble the washer and the nut to the bolt, and then use the spanner to fasten the nut (7 Nm).

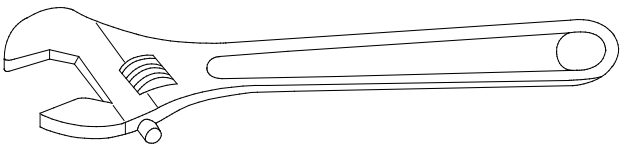
Required tools for installation



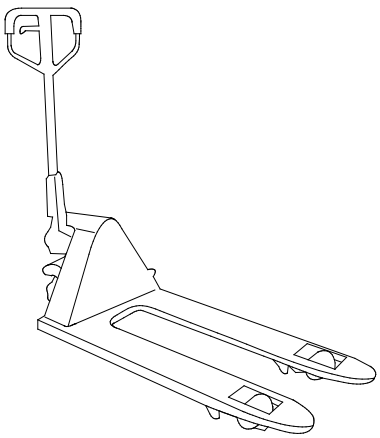
[Figure 4-6: A Flat head driver for the front cover knob (larger than 10 mm)]



[Figure 4-7: The Plus head driver (No.2) for the tray, the side cover, and grounding]



[Figure 4-8: A spanner for fastening use]



[Figure 4-9: A fork lifter with height of 85-200 mm]

5. Electrical Connections

NOTICE

The All in One system can be damaged by static discharge.

Before you touch a component inside the All in One, ground yourself by touching PE or a grounded object

CAUTION

When handling with the Li-Ion Battery Tray for the All in One, you must wear the following personal protective equipment:

High voltage rated rubber gloves

Safety goggles or other protective eye equipment

40-minute standby period of time to complete discharging in the system before testing electrical parts inside the system!

Follow the guidelines below when handling the Li-Ion Battery Tray.

Do not intentionally short circuit the positive (+) and negative (-) terminals with a metallic object.

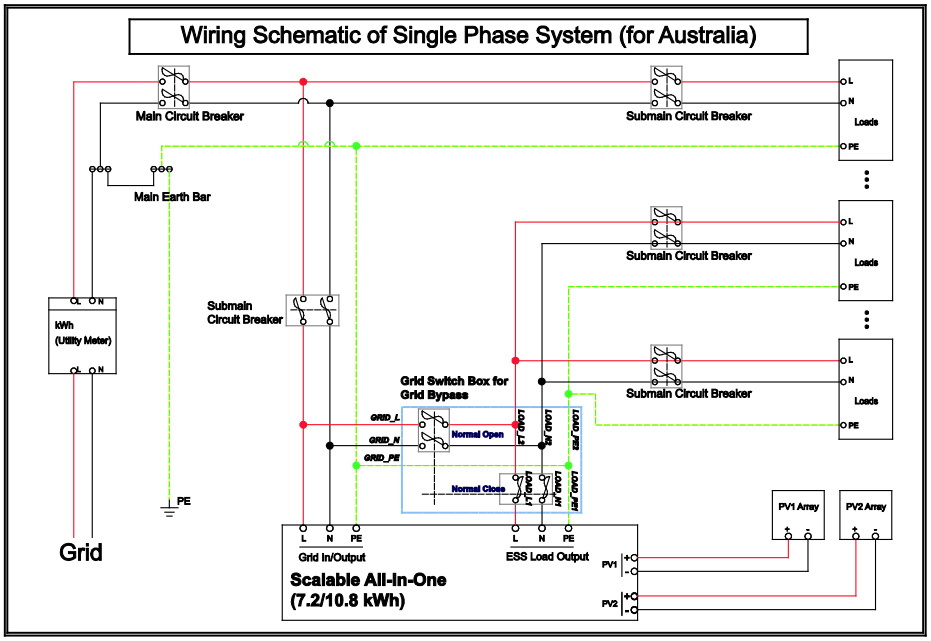
Do not remove the cap on the terminals. If the cap is removed, avoid contact between the metals and the battery terminals. Do not damage the screw thread.

Do not use seriously scarred or deformed battery. Dispose immediately according to proper regulations.

Do not damage sheath of cable and connectors.

5.1 The Overview of Electrical Connection

The Scalable All in One has two solar energy inputs (PV1, PV2). 3.3 kW (per string) is the maximum output for each PV input. The Grid of All in One is connected to the Grid. The Load of All in One is connected to the Home Load. Between the Home Load and the Grid, the Digital Energy Meter is placed for power metering. The AC circuit breaker and DC Isolator in the distribution box are installed between the All in One for safety reasons.



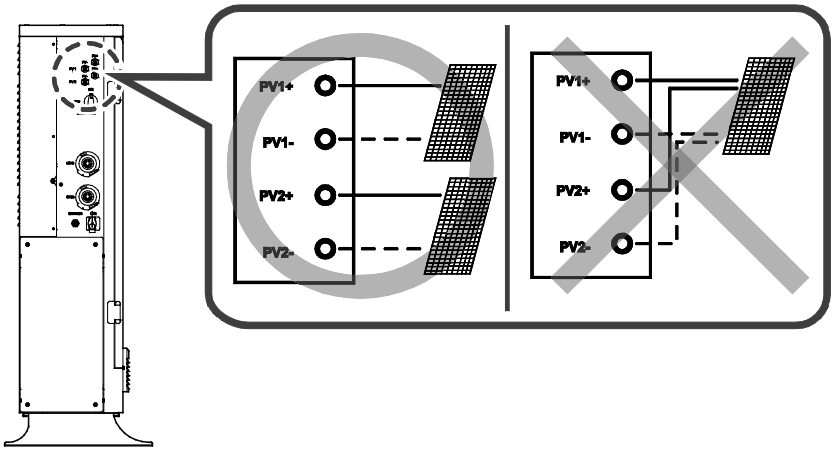
[Figure 5-1: Electrical connections]

As shown in the [Figure 5-2], the Scalable All in One uses the two independent channels of the PV Input ({PV1+, PV1-}, {PV2+, PV2-}). They are used independently for running the maximum power from the sources of PV1 and PV2. Two channels are recommended for independent use for the two PV Inputs. Make sure not to connect one PV string in parallel with the two independent PV inputs (PV1, PV2). (Refer to Scalable All in One Solar energy input connection in the [Figure 5-2]).

A PV string must not be commonly connected to the two input terminals of the All in One system. That is, make sure not to connect the split wiring from one PV string output with the two independent PV inputs (PV1+, PV1- and PV2+, PV2-). (Refer to the PV String connection method in the [Figure 5-2]).

When want connect the two PV input with one PV Module, should be carried out by qualified personnel only.

※ ***PV modules shall have an IEC61730 Application Class A rating or equivalent.***



[Figure 5-2: PV connections]

As shown in the [Table 5-1], the input / output power cables correspond to the AC/ DC input / output specifications for this system.

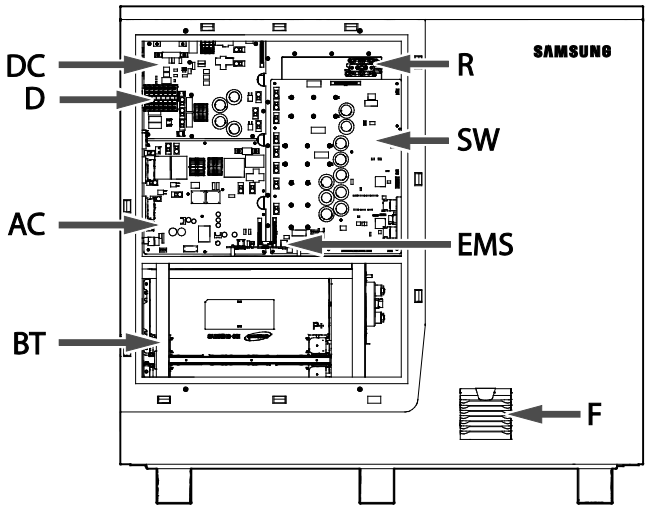
Recommended cables for the Scalable All in One

	Area	Insulation	Color code
Grid/Load (L, N)	6~16 mm^2	600 V or more	Black
PE	6~16 mm^2	600 V or more	Green with yellow lines
PV (+), (-)	6 mm^2	700V or more	Black

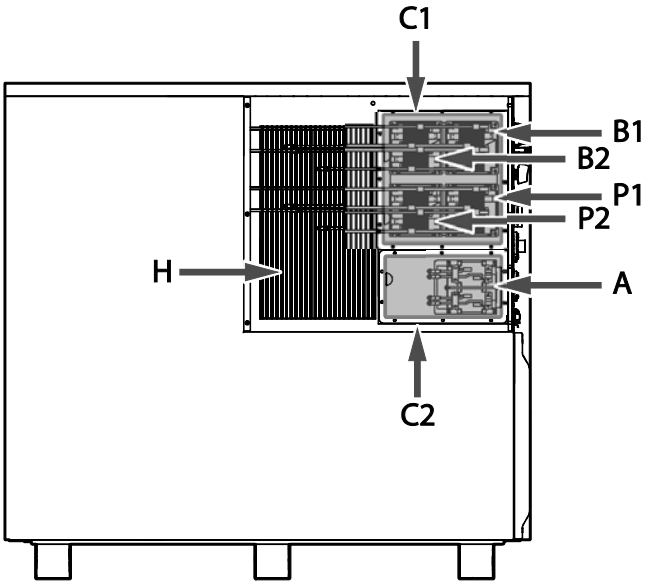
Object	Part List	Type
D	DC Isolator	INVERTER
R	Battery Relay	INVERTER
F	Air Filter1 (Bottom)	INVERTER
DC	DC Board (PN. SJ92-01490A)	INVERTER
AC	AC Board (PN. SJ92-01489A)	INVERTER
SW	SW Board (PN. SJ92-01491A)	INVERTER
EMS	EMS Board (PN. SJ92-01424x)	INVERTER
A	AC reactor	INVERTER
P1	PV1 reactor	INVERTER
P2	PV2 reactor	INVERTER
B1	BDC1 reactor	INVERTER
B2	BDC2 reactor	INVERTER
H	Heat sink	INVERTER
C1	DC reactor case	INVERTER
C2	AC reactor case	INVERTER
BT	Battery Tray top view	BATTERY

[Table 5-1: Component Description]

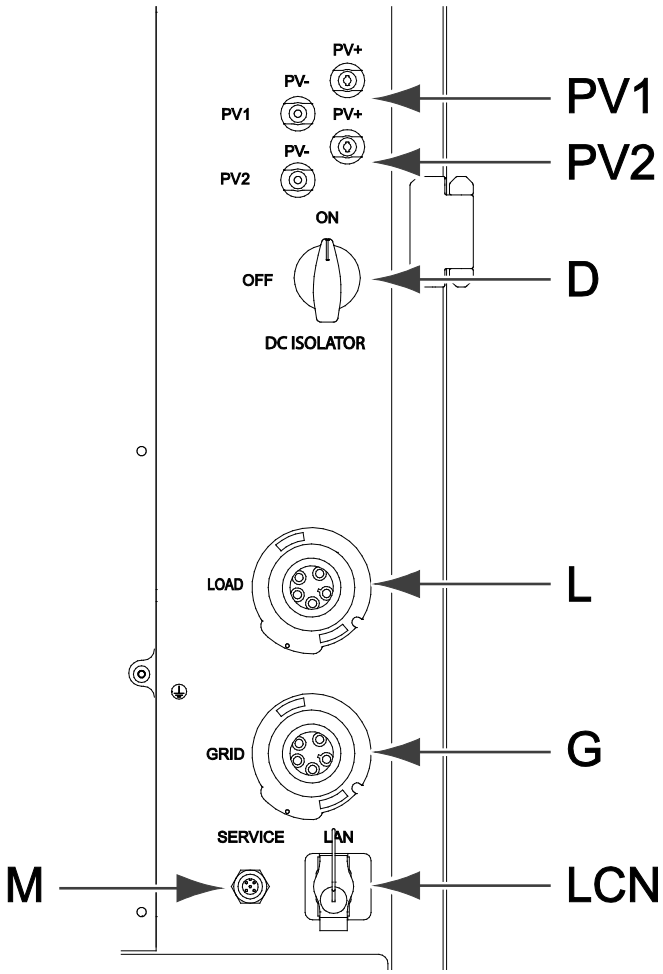
The [Figure 5-3] shows the overall drawing of the scalable system. Please refer to the figure of the drawing for installation and maintenance.



[Figure 5-3: Front Inside View]



[Figure 5-4: Rear Inside View]



[Figure 5-5: Side View]

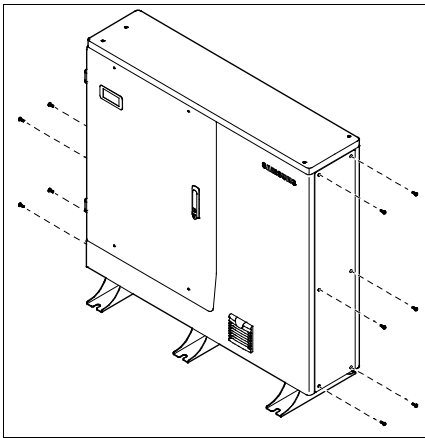
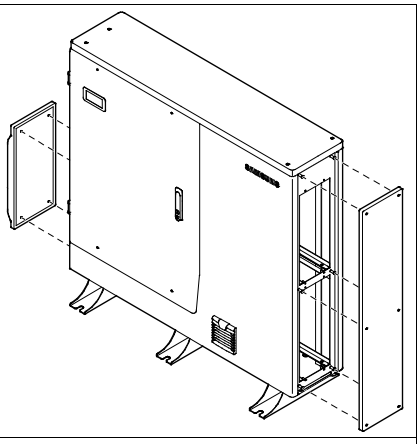
Object	Part List	Type
PV 1	PV input 1	INVERTER
PV 2	PV input 2	INVERTER
D	DC Isolator	INVERTER
L	ESS Load Output	INVERTER
G	Grid Input	INVERTER
LCN	LAN Connector	INVERTER
M	Service for installation	INVERTER

[Table 5-2: Part List]

5.2 Opening the Side Case Cover

As shown in the [Table 5-3], Scalable All in One is delivered with the side case cover attached. Remove the side case cover for electrical connections.

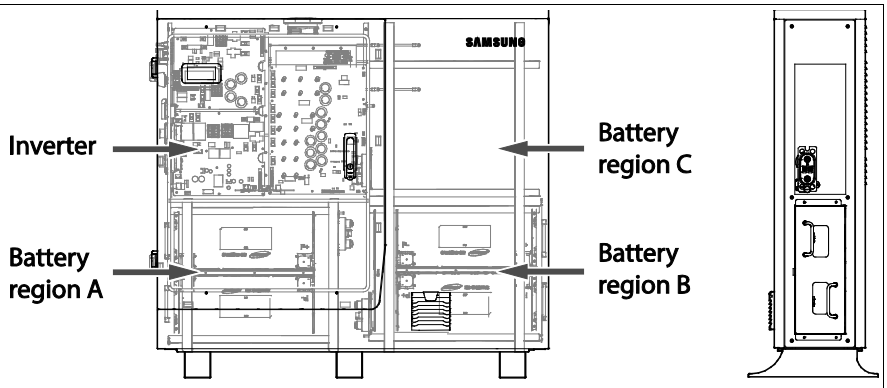
	CAUTION
	Never open the front case cover because it is for after-sales service only. Its high voltage and current may cause damage to your body. Keep the key of the cover in a safe place for later use.

	
Side Case Bolt Turn the screws counterclockwise to disassemble.	Cover Open View

[Table 5-3: Front Case Open Process]

5.3 The Overview of the Connection Area

The [Table 5-4] shows the inner structure of the 7.2 kWh All in One when the front case cover is removed (Section 5.1).



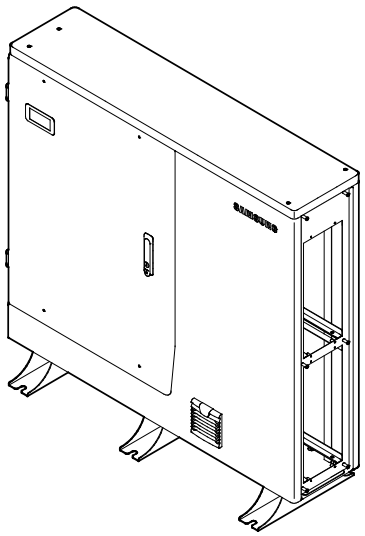
Inside Front View	Inside Rear View
On the front area in the system, the INVERTER circuit is placed. Please be careful upon handling. Insert batteries in A and B for installation of the 7.2 kWh system. Insert batteries in A, B, and C for installation of the 10.8 kWh system.	On the upper tray area in the system, a connector is located (at the battery contact in the 7.2 kWh system). The connector contacts a battery terminal instead of the battery tray.

[Table 5-4: Front and Rear view of All in One (For 7.2 kWh system)]

5.4 Battery Installation

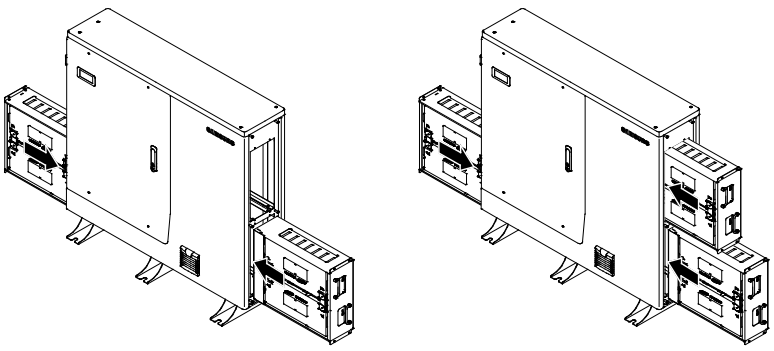
5.4.1 7.2 kWh and 10.8 kWh Battery Installation

1. As described in Subsection 5.2, remove the side case.



[Figure 5-6: Removed Side Cover View]

2. Prepare the battery tray to dock the battery on the main body and have at least the two persons work together because the battery weighs much. The [Figure 5-7] shows the battery tray seen from the enclosure.

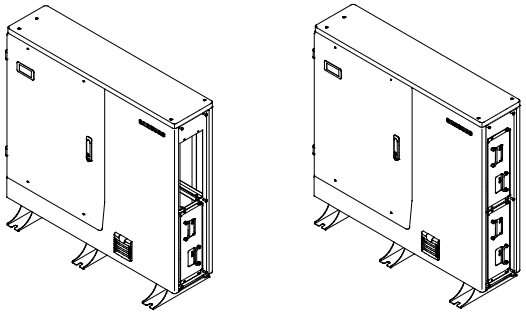


7.2 kWh **10.8 kWh**

[Figure 5-7: Battery Connection]

3. When docking the battery, make sure not to leave space with main body. After docking the battery, fasten the screws to fix the tray and the body. Make sure to have two persons lift the battery tray.

   Use a torque screwdriver of 1.4 – 1.6 Nm to tighten the screws on the battery tray.



7.2 kWh **10.8 kWh**

[Figure 5-8: Battery Docking description]

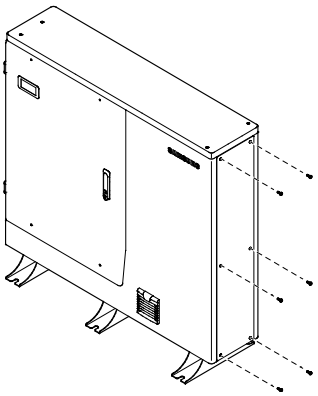
5.4.2 Scalable (From 7.2 kWh to 10.8 kWh)

	CAUTION When it is scalable from 7.2 kWh to 10.8 kWh, the system is maintained with the battery life (SOH, EOL) for 7.2 kWh. It means that the system guarantees the battery life for 7.2 kWh. When it is scalable to 10.8 kWh, the battery life is guaranteed for 7.2 kWh.

	NOTE When it is scalable from 7.2 kWh to 10.8 kWh, contact the installer.

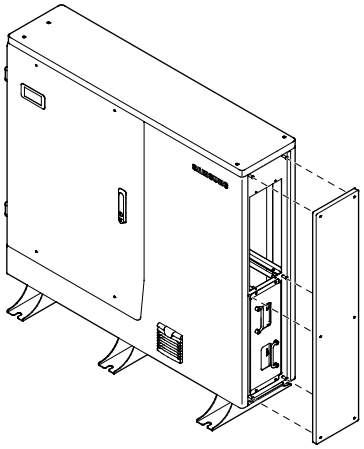
1. Unfasten 6 side cover bolts.

Screwing Torque = 1.4 Nm



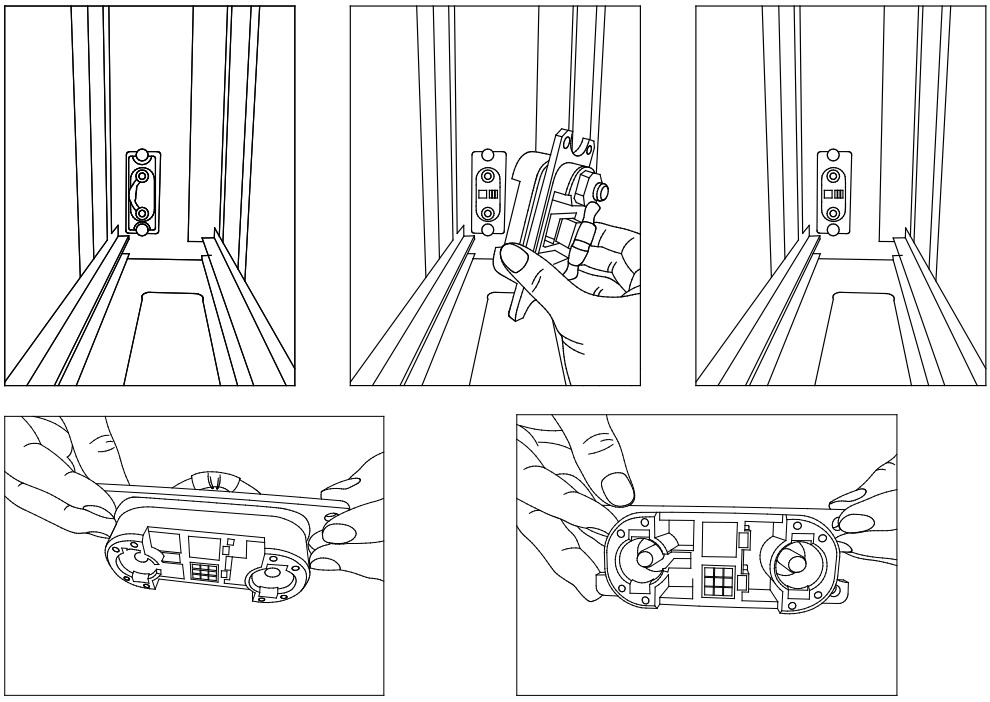
[Figure 5-9: Unfastening screws]

2. Side cover open



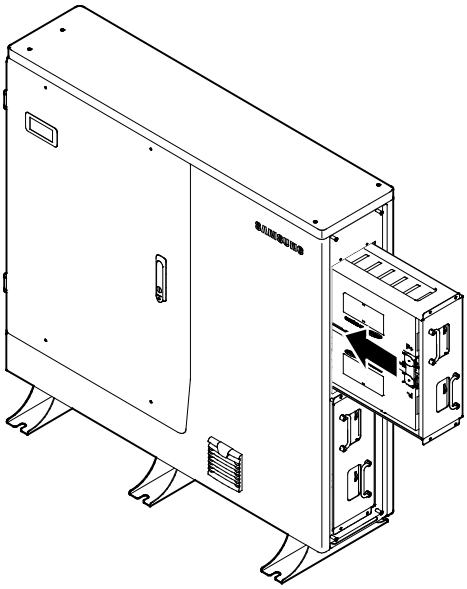
[Figure 5-10: Removal of the side cover]

3. Unfasten 6 screws for the battery cover grade and remove the battery cover grade.



[Figure 5-11: Removal of the battery cover grade]

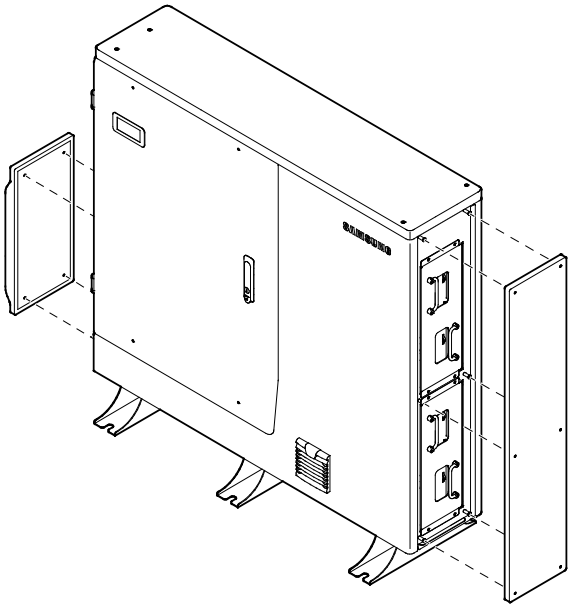
4. Mount the battery tray.



[Figure 5-12: Battery tray mounting]

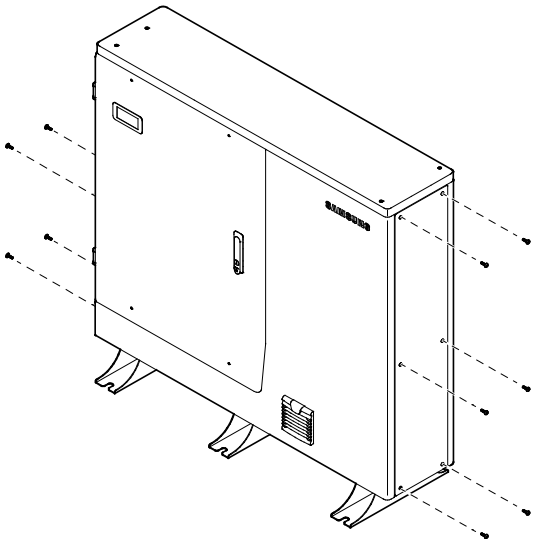
5.5 Closing the Side Case Cover

1. Hold the side case cover with both hands.



[Figure 5-13: Side Cover Assembly process 1]

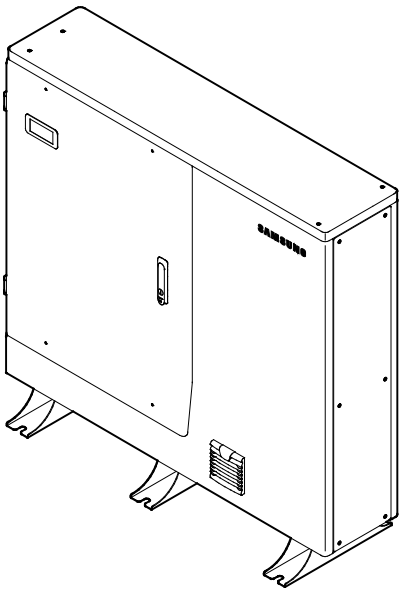
2. Hang the product cover on the upper surface of the enclosure, then push the product cover forward to close it.



Screwing Torque=1.4 Nm

[Figure 5-14: Side Cover Assembly process 2]

3. As shown in the [Figure 5-15], use a tool such as a flat driver to fix the bolts into ten positions.



[Figure 5-15: Side Cover Assembly process 3]

5.6 A Method of Locking the Distribution Box (Board)

The distribution board performs the following functions when it is connected to the INVERTER, the PV and the Grid.

- Grid block function (external) AC circuit breaker

  : 230 Vac, 63 A, 10 kA (short circuit current rating)

- DC block function; DC Isolator may be fitted.

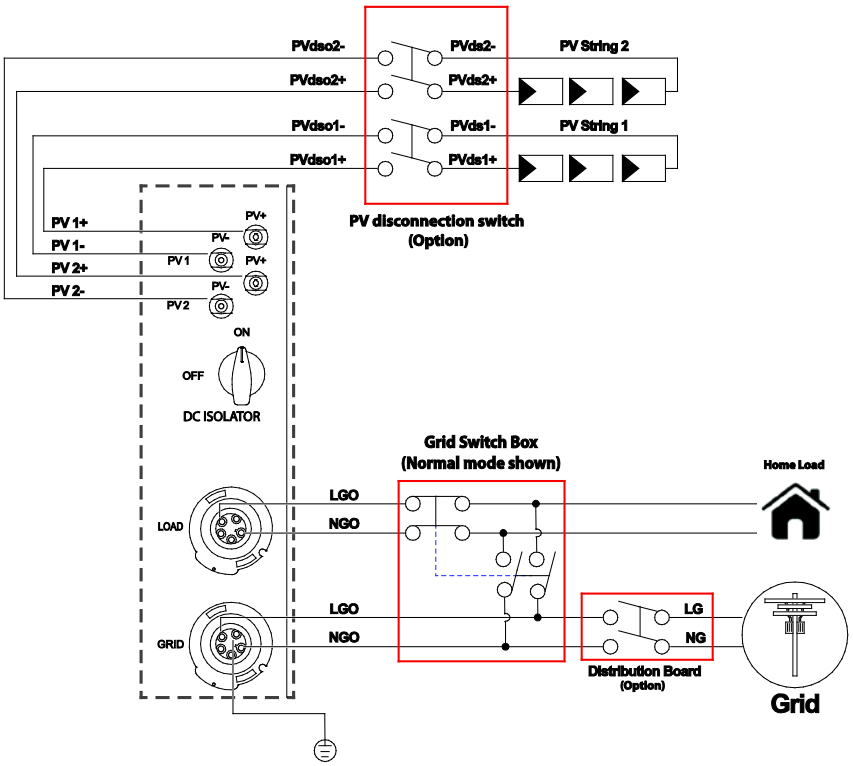
  PV String1 block function (external) DC Isolator

  PV String2 block function (external) DC Isolator

  : 650 Vdc or more / 15 A or more

- Residual current device (RCD): Leakage current measure and block

The [Figure 5-16] shows the connection diagram on the distribution board. The distribution box receives the DC input (the PV string 1 and the PV string 2) from the solar energy module. The power grid and the house load are connected to the Grid (L, N) and Load (L, N).



[Figure 5-16: Distribution box connection diagram]

CAUTION

The PV string 1 and the PV string 2 must be each connected to the distribution box terminals, as shown in the distribution board connection diagram. Make sure that the string numbers match correctly.
For example do not connect a PV string 1 to a PV string 2.

5.6.1 AC Circuit Breaker and DC Isolator

The circuit breaker populated on the distribution board varies depending on the installer. Follow the installation standards to install a circuit breaker satisfying the voltage, the current specification of the Grid and the PV. The cables presented in the [Table 5-5] are recommended for use.

Item	Standard	Short circuit current rating
AC circuit breaker	230 Vac / 63 A	10 kA minimum
DC isolator	650 Vdc / 15 A or more	-

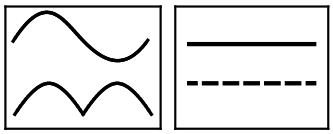
Item	Area	Insulation	Color code
Grid/Load (L, N)	6 mm^2	600 V or more	Black
PE	6 mm^2	600 V or more	Green with yellow lines
PV (+), (-)	6 mm^2	700 V or more	Black

[Table 5-5: Circuit breaker, DC Isolator and power line specification]

As illustrated in the [Figure 5-16], the distribution box connection diagram, the connection between the All in One system and the distribution box is made to the terminals of the solar energy (PVdso1+,PVdso1-,PVdso2+, and PVdso2-) of PV1+, PV1-, PV2+, and PV2-.
On one hand, the main body terminals (PV1 +, PV1 -, PV2+, PV2-) and the distribution box terminals are connected in proper order. On the other hand, for the lines coming from the GRID, L and N leads are connected to the distribution board (LG, NG). The lines coming out from the LGO, PGO of the distribution board are connected to the L and N terminals of the All in One System.

5.6.2 RCD (residual current device) Leakage Circuit Breaker

This product can cause a DC current in the external protective earthling conductor. Where a residual current-operated protective (RCD) or monitoring (RCM) device is used for protection in case of direct or indirect contact, either an RCD or RCM of Type B is only available on the supply side of this product.

ITEM	Description	
	Type B	Type B devices, which detect residual currents comprising of pure AC, rectified AC and pure DC

[Table 5-6: RCD Leakage circuit breaker description]

5.7 Grid Switch Box Connection between Grid and System

CAUTION

When it is required to check the ESS system and its connected load, make sure that the Grid is disconnected.

Power is supplied to the Grid Switch Box from Grid upon any failure in the ESS system. Normal indicates that the power for the load is supplied via the ESS system.

During
1. ordinary times,
2. power outage (when the ESS system is in normal status),
3. and normal status after finishing the quality inspection of the product,
set it to Normal to supply power to the load via the ESS system.

In case of failure in the ESS system, power must be supplied from Grid by Bypass.

When power outage happens, it is changed to the stand-alone mode within 30 seconds to supply power to the load.

When the elapsed time is over 30 seconds after power outage but power is not supplied to the load, it is caused by the ESS system failure.

1. Upon no PV power generation,
2. full battery discharge,
3. and ESS system failure,
it must be changed to Bypass to supply power to the load upon restoration from power outage.

NOTICE

- At this time, the power to the load is switched from the ESS system to the main system.
- If the switching occurs when the ESS system is in normal status, the following actions are sequentially taken. At this time, the system encounters no problem but the power outage happens for the switching time of the load switch from OFF to Bypass.

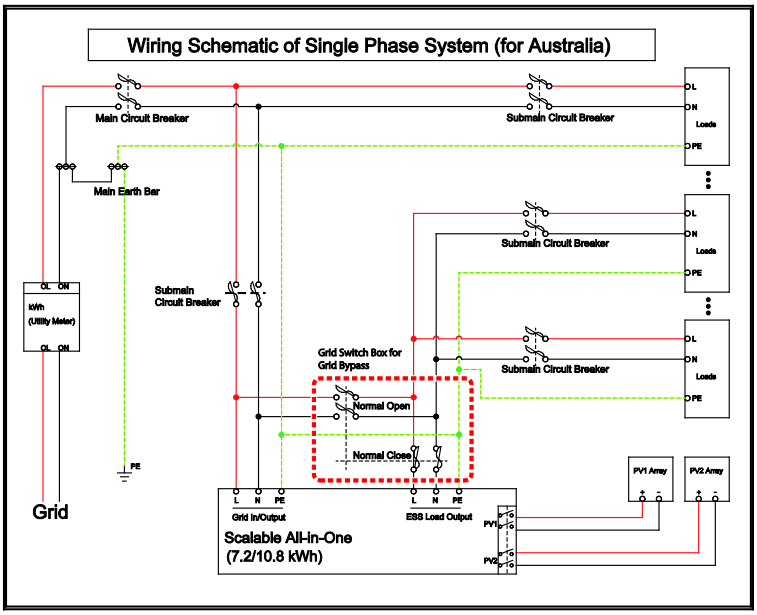
  ⓐ While the ESS system supplies power: The switch is switched from OFF to Bypass. The load encounters power outage for the switching time and then power is supplied from the main system to the load by Bypass. When the power that is being supplied from the ESS system to the load, is instantly supplied to the system, the power level can exceed the zero feed-in limit but it will be stabilized within several seconds.

  ▶ System encounters no problem except from load power outage during the switching time.

  ⓑ While the ESS system supplies no power: The switch is switched from OFF to Bypass. The load encounters power outage for the switching time and then power is supplied from the main system to the load by Bypass.

  ▶ System encounters no problem except from load power outage during the switching time.

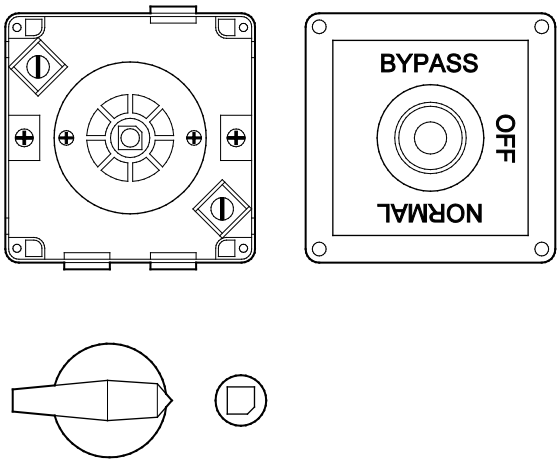
1. Grid Switch Box Wiring Schematic of Single Phase System for Australia



[Figure 5-17: Wiring Schematic of Single Phase System for Australia]

2. Assembling the Grid Switch Box

a. The components of the Grid Switch Box are as follows.



[Figure 5-18: Components of Grid Switch Box]

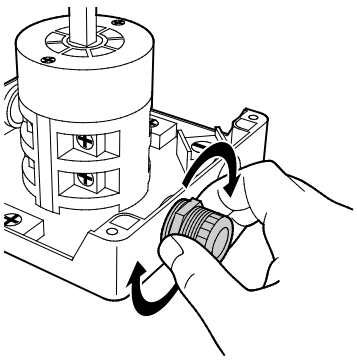
NOTICE

Properly use the fitting tools and apply the following torques as maximum values:

For M4 - 1.5 Nm, for M6 - 5 Nm, for M8 - 20 Nm and for M10 - 40 Nm

When securing the handle, do not tighten the screw more than required.

b. Assemble the cable gland into the hole of the Grid Switch Box.

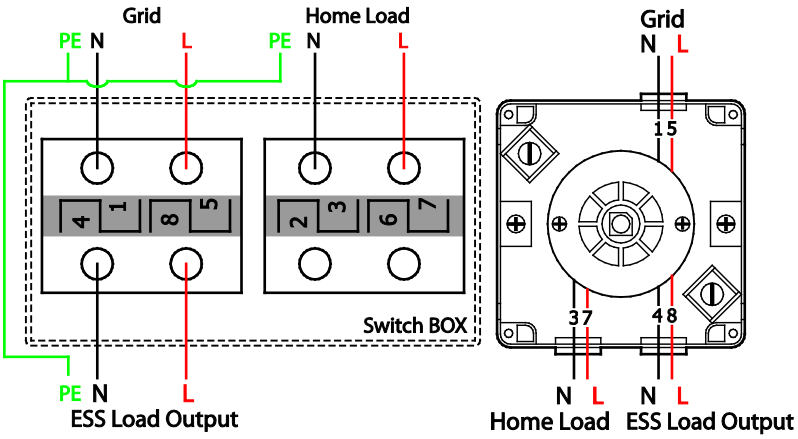


[Figure 5-19: Assembling the Cable Gland]

NOTICE

- The cable gland is not included in the product package. For installation, it is required to be purchased separately.
- The M25 x 1.5 mm product is recommended.

c. Check the wiring diagram of the Grid Switch Box.

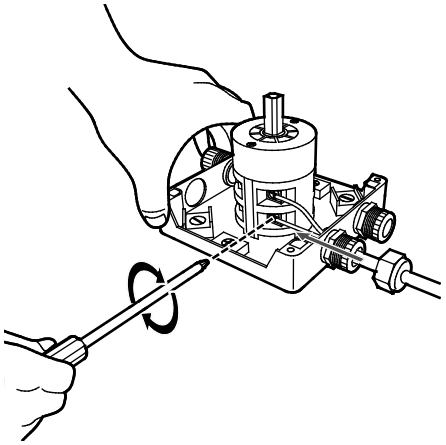


[Figure 5-20: Wiring Diagram]

CAUTION

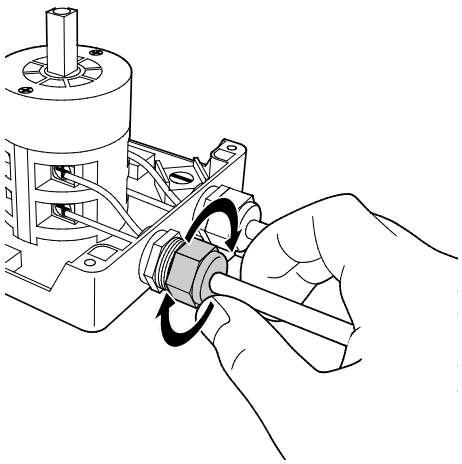
To operate the product normally, be sure to wire according to [Figure 5-20]. Incorrect wiring may cause product malfunction.

d. Assemble the wires according to [Figure 5-20].



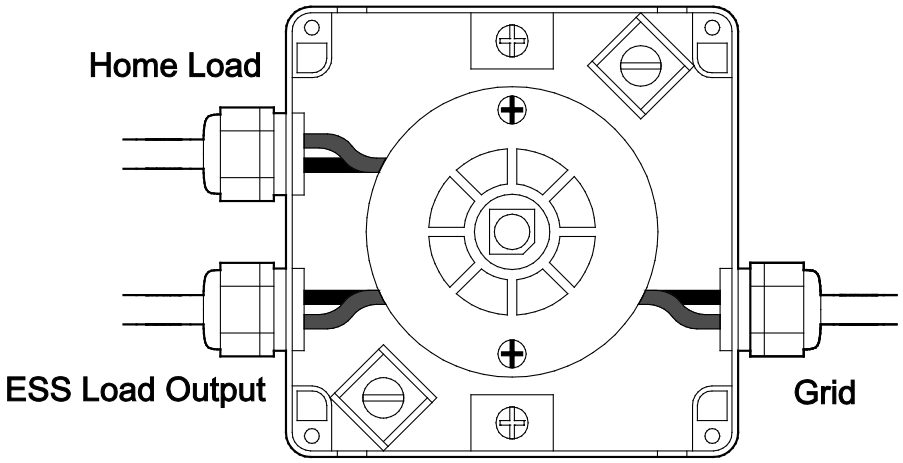
[Figure 5-21: Assembling the Wires]

e. Assemble the sealing nuts.



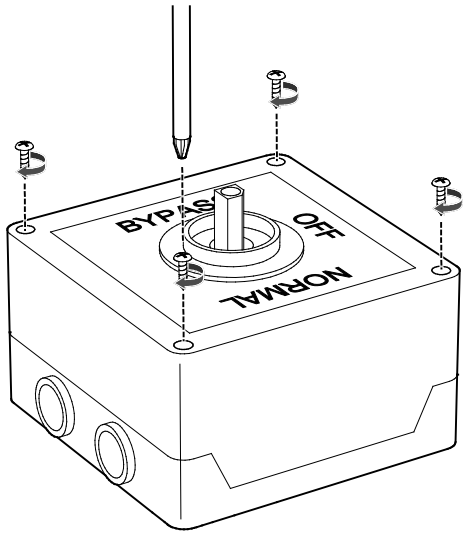
[Figure 5-22: Assembling the Sealing nuts]

f. The final assembly is as follows



[Figure 5-23: Final assembly]

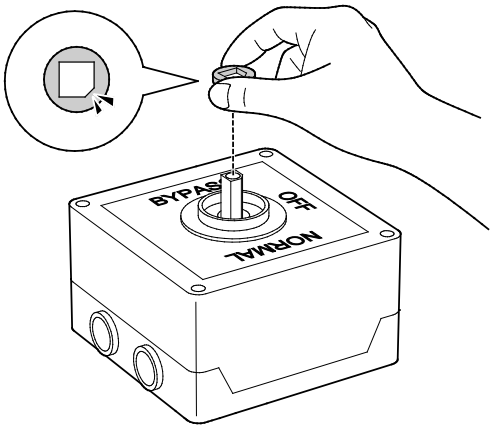
g. Close the upper part of the Grid Switch Box and tighten the embedded screws.



[Figure 5-24: Assembling the Upper Part]

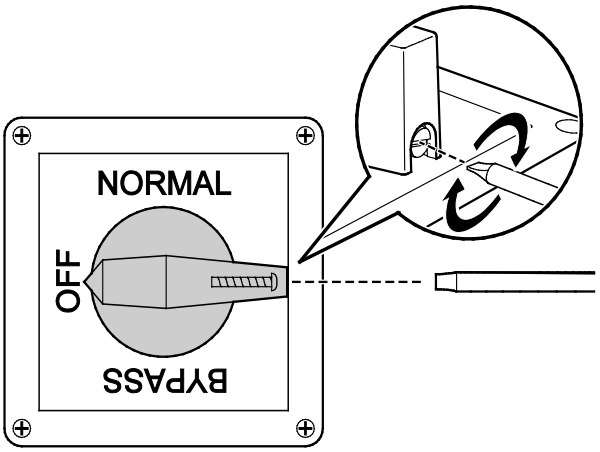
	Information
	The screws in the upper part are already embedded in each hole.

h. Assemble the rubber seal after aligning with the groove of the shaft.



[Figure 5-25: Assembling the Rubber Seal]

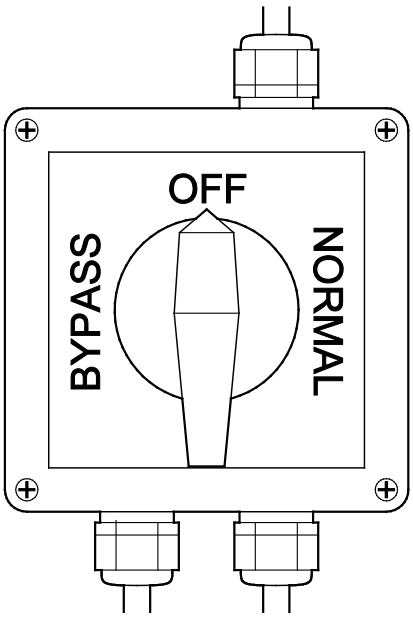
i. Assemble the knob after aligning with the groove of the shaft and tighten it with an embedded screw.



[Figure 5-26: Assembling the Knob]

	Information
	The screw is already embedded in the knob.

j. The final assembly of the Grid Switch Box is as follows.

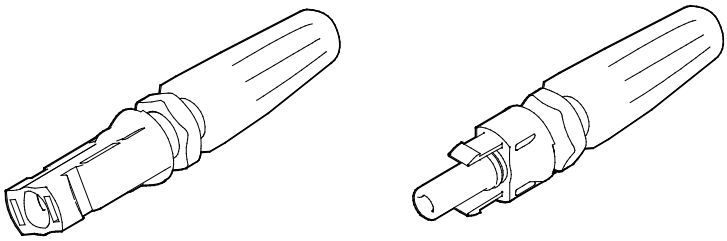


[Figure 5-27: Final Assembly]

5.8 A Connecting Method of DC and AC Line

Refer to the [Figure 5-28] for the PV module connection. The lead wire coming from the PV module is connected to the distribution box. For the structure of the distribution box, refer to subsection 5.7. For the connection to the distribution box, connect each to the terminals of the solar energy of PV1+, PV1-, PV2+, and PV2-. On the other hand, connect the distribution box terminals with the main body terminals (PV1+, PV1-, PV2+, and PV2-) of the Scalable All in One in proper order. The lead wire thickness is presented shown in the following Table.

For the connectors (PV1+, PV1-, PV2+, and PV2-) between the distribution box and the All in One input, the following types of connectors are used (MC4 connector, PV-Stick Photovoltaic connector "PUSH IN "connection).

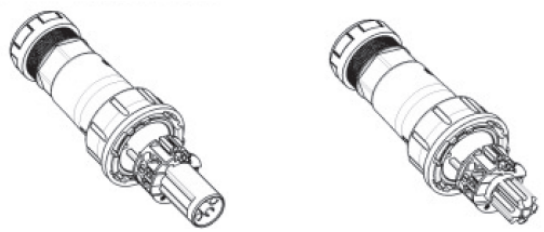


[Figure 5-28: PV connector (Female) and PV line (Male)]

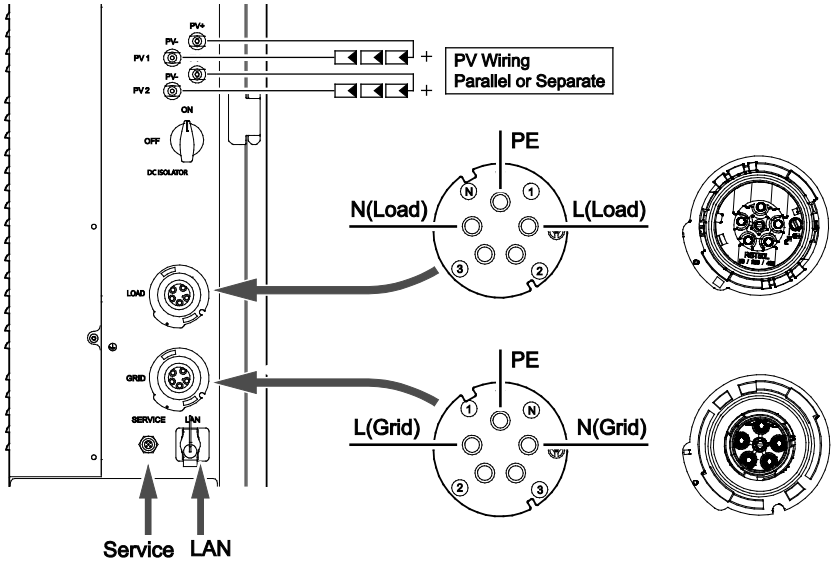
The [Table 5-7] shows the lead wire standard for the PV. The thickness (6mm^2) of the lead wire is recommended for the All in One.

Type	Area	Insulation	Color code
PE	6 mm^2	600 V or more	Green with yellow lines
PV (+), (-)	6 mm^2	700 V or more	Black

[Table 5-7: Wire Standard]



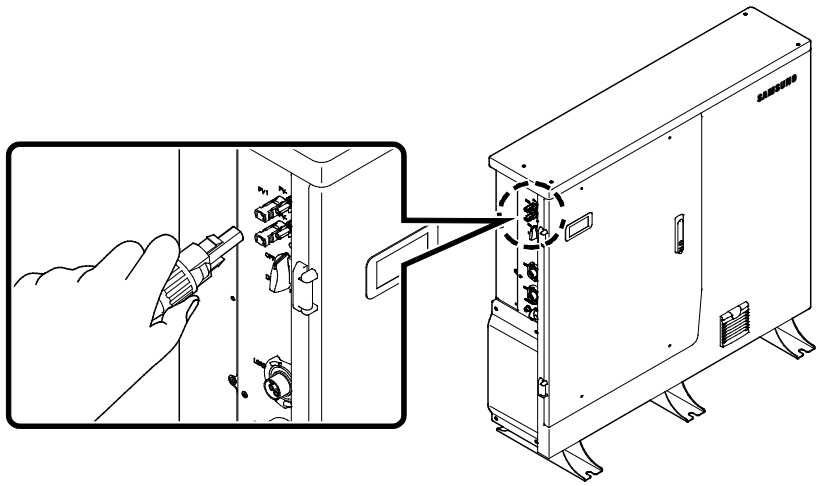
[Figure 5-29: Load Connector (Male) and Grid Connector (Female)]



[Figure 5-30: Connection of system for floating solar array, load and grid]

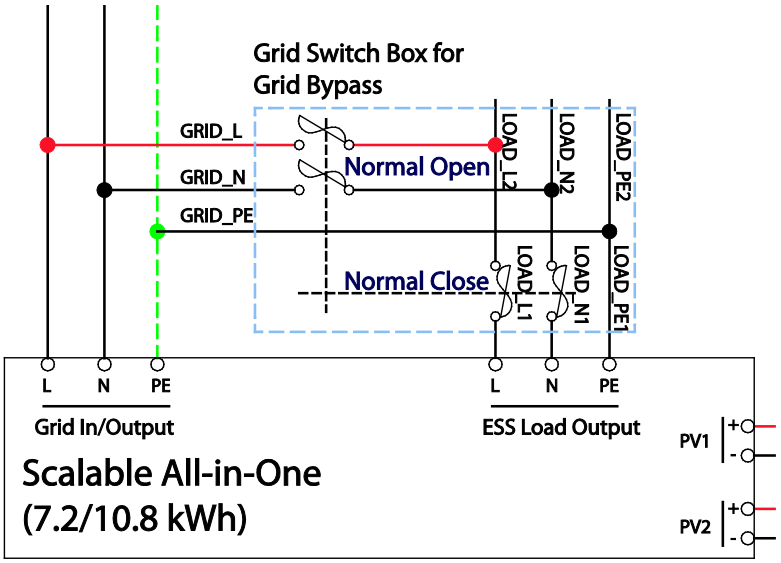
The Male product is connected to the lead wire coming from the distribution box in the PV side, and the Female part is attached to the All in One system. The two products are properly docked when connected together.

	CAUTION
	Damaged products must neither be installed nor put into operation. Pay attention especially to flawless seals. The connectors are not for current interrupting. Never connect or disconnect under load!



[Figure 5-31: PV connector connection (MC4 connector connection)]

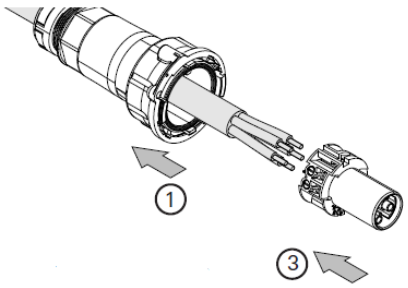
We recommend the cable composed of two power cords and one PE cord and have insulation cover which contains all three cords as in the figure. Each cord shall be 6 mm^2 and the diameter of the cable shall be approximately 18 mm^2. Make sure that the PE cord is longer than other live cords of the cable so that the PE cord will not be affected by the pulling force. The PE terminal is connected to the PE of the sash to be ground connected.



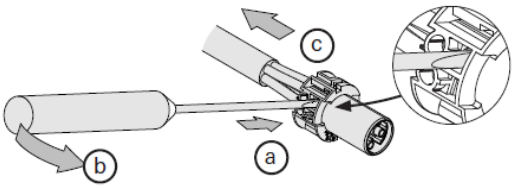
[Figure 5-32: L and N AC line connection method]

5.8.1 Mounting

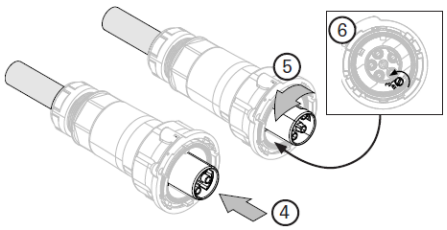
1. Move housing over cable
2. Prepare conductor
3. Insert prepared conductors (with screw connections: tighten screws, torque 2 Nm (17.7 lbf-in))



	NOTE
	Due to cold flow, extreme temperatures or temperature variations may have a detrimental effect on the strain relief.
	NOTE on Releasing Crimp Connections
	a. Insert screwdriver (see detail) b. Open latch by screwdriver c. Take out cable



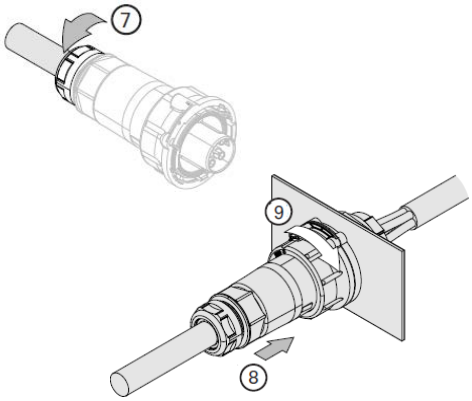
4. Insert contact insert into housing(note)
5. Turn contact insert until arrested.
6. Lock contact insert.
7. Tighten cable gland, torque



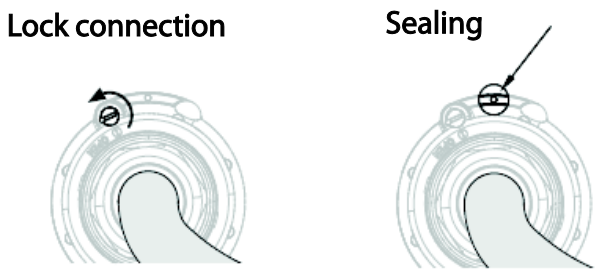
M32 gland: 12 Nm (106 lbf-in)

M40 gland: 14 Nm (124 lbf-in)

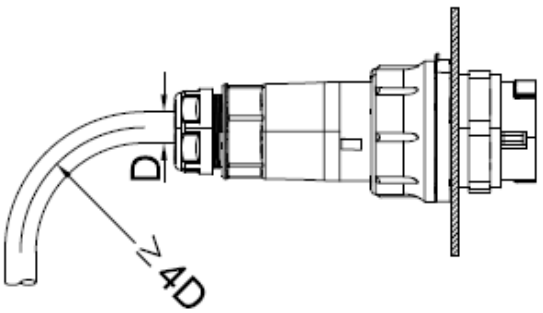
8. Plug in RST connector
9. Fasten bayonet



Options



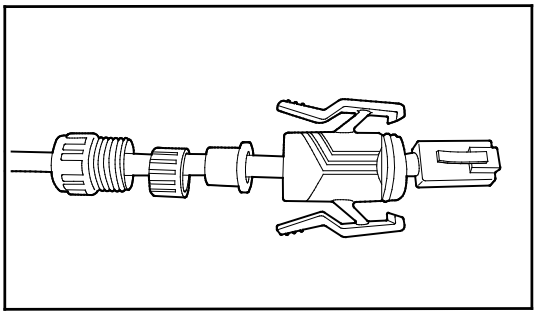
[Figure 5-33: Optional Actions]

	CAUTION
	Observe minimum bending radius of the cable (see illustration)! Ensure the connector is not exposed to external forces (e.g. pull on the cable) Through capillary forces, water in the sealing area of the cable gland can enter the connectors. So, always run cables in a way that allows water to drain off from the sealing area. 

5.9 LAN Cable Connection between PC and System

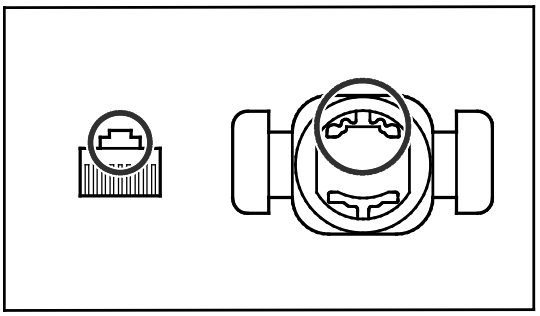
1. Assembling the cable for the RJ45 sleeve housing.

   a. The structure of the cable for the RJ45 sleeve housing is as follows.



[Figure 5-34: Structure of the cable for RJ45 sleeve housing]

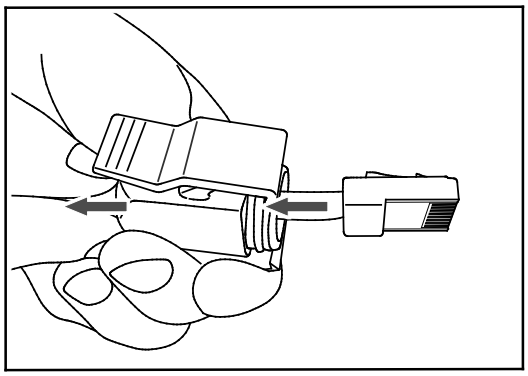
   b. Check the locations for the RJ45 cable clip and the groove of the RJ45 sleeve housing.



[Figure 5-35: RJ45 cable clip and the groove of RJ45 sleeve housing]

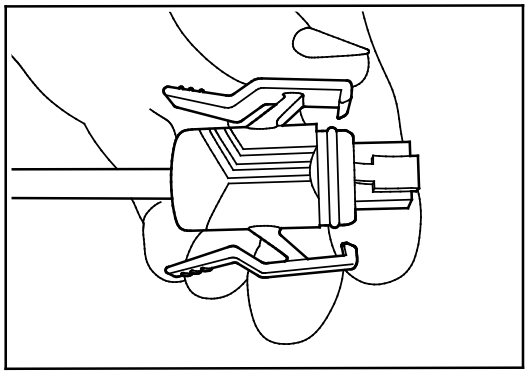
	NOTICE
	To operate the product normally, be sure to align the clip of the product with its groove as shown in the figure

c. Assemble the RJ45 LAN cable.



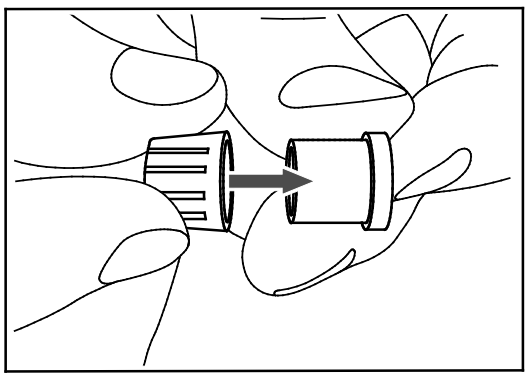
[Figure 5-36: Assembling RJ45 LAN cable]

d. Check for the fastening RJ45 LAN cable in RJ45 sleeve housing until it snugly fits.



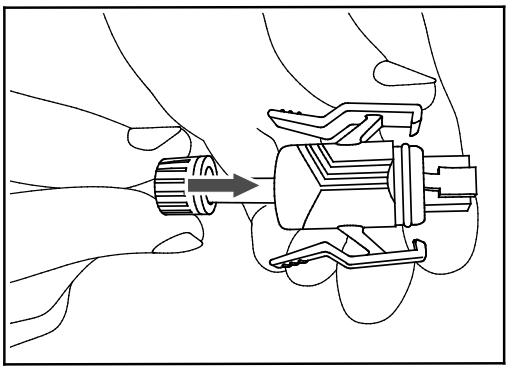
[Figure 5-37: Fastening RJ45 LAN cable in RJ45 sleeve housing]

e. Assemble the sealing cap set.



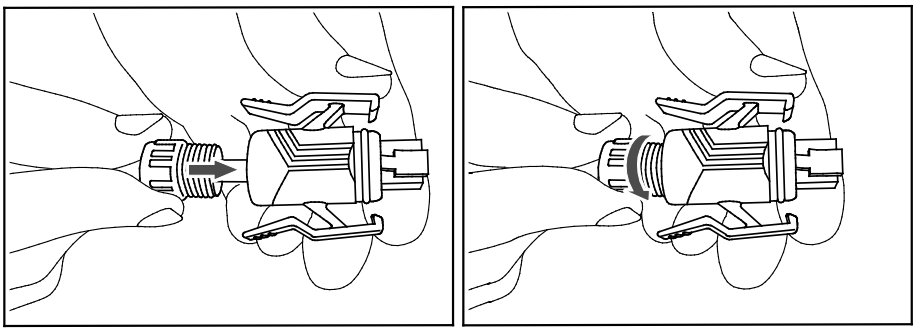
[Figure 5-38: Assembling the waterproof cap set]

f. Put the assembled sealing cap on the RJ45 LAN cable and insert it into the RJ45 sleeve housing.



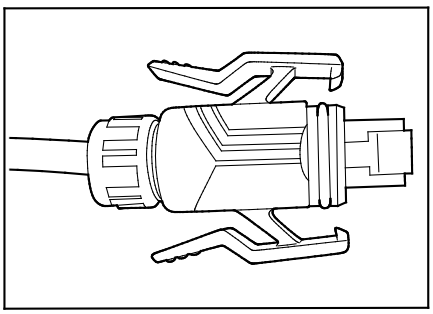
[Figure 5-39: Putting the sealing cap into RJ45 sleeve housing]

g. Put the sealing nut on the RJ45 LAN cable and tighten it to the RJ45 sleeve housing.



[Figure 5-40: Assembling the sealing nut to RJ45 sleeve housing]

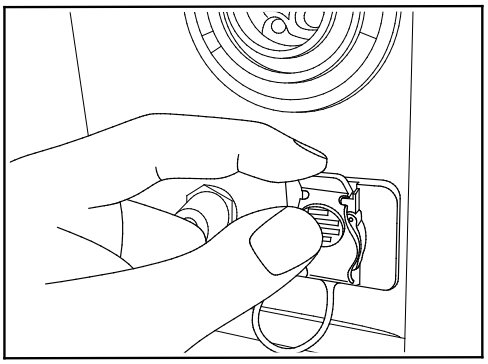
h. The final assembly of the RJ45 sleeve housing cable is as follows:



[Figure 5-41: Assembled RJ45 sleeve housing cable]

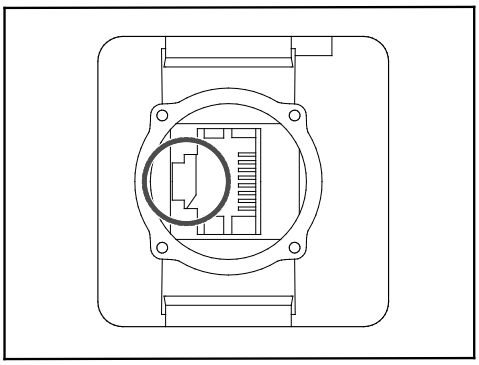
2. Fastening the assembled cable to the system.

   a. Open the cap of the RJ45 LAN socket.



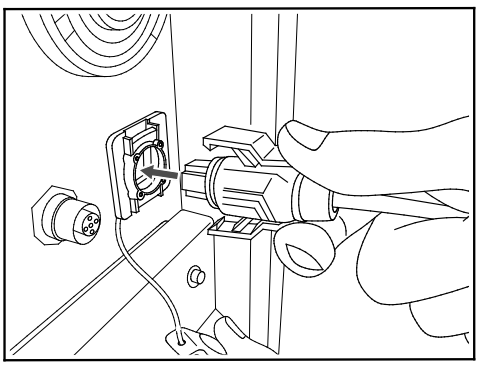
[Figure 5-42: Opening the cap of RJ45 LAN socket]

   b. Check the groove position of the RJ45 LAN port.



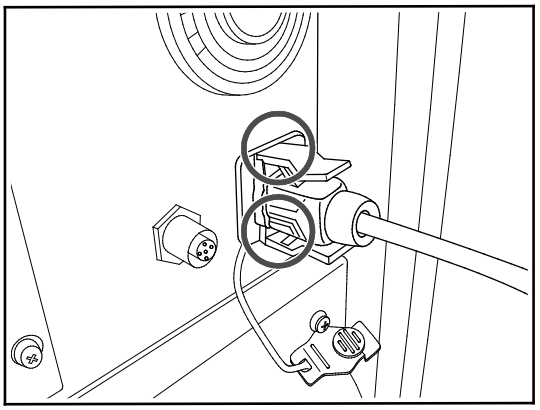
[Figure 5-43: Position of RJ45 LAN port]

   c. Insert the assembled cable in the direction of the arrow.

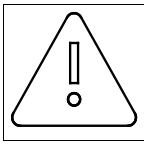


[Figure 5-44: Inserting the assembled cable]

d. Lock the assembled cable with the upper and lower locking grooves.



[Figure 5-45: Upper and lower locking grooves]



NOTICE

To operate the product normally, be sure to check for its locking status.

6. Communication Connection

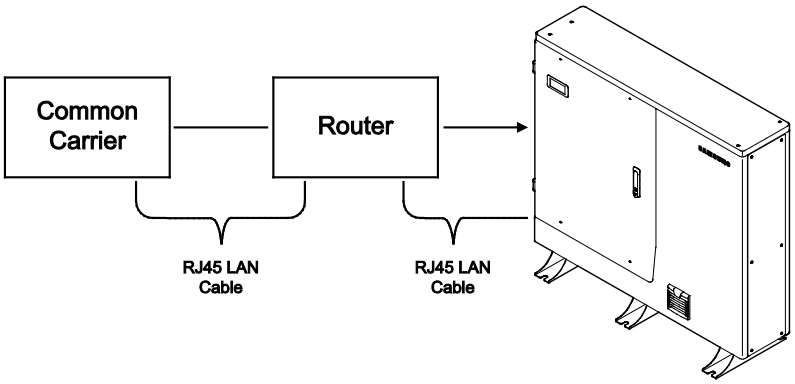
6.1 Internet Connection

6.1.1 Components

- Wired Router (not provided in the product package)
- RJ45 general LAN Cable (not provided in the product package)

6.1.2 Connection Block Diagram

LAN (Common carrier → Router) → ESS



[Figure 6-1: Internet Connection]

6.1.3 Connection Method

Plug the RJ45 LAN Cable between the LAN terminal and the Router.

7. Entering Initial Installation Information

You can use the following procedure to enter the initial installation information and to monitor the operational information of this system appropriately on server.

7.1 Information Input Administrator

You have to use a laptop or a smart phone to enter the installation information.

7.2 System Information input stage

- 1st Step : Direct Connection to PC -> Input Local Setting Value
- 2nd Step : Connection to Web Page -> Input Webpage Setting Value

7.3 Web Page Connection

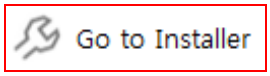
7.3.1 Web Page Connection

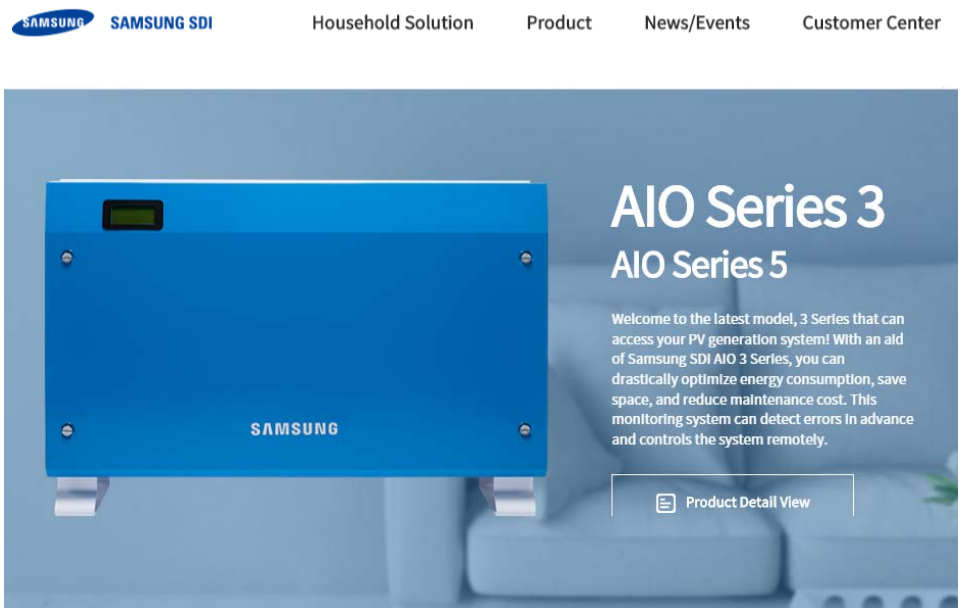
Open an Internet browser of your computer or smart phone, then enter the designated address. Then the system information input page pops up.

Input URL: https://myess.samsungsdi.com/engineer/main.do or

https://112.106.12.149/engineer/main.do

1. By typing ""https://myess.samsungsdi.com," access the corresponding website. Then click the "Go to Installer" icon at the top.




SAMSUNG SDI
Household Solution
Product
News/Events
Customer Center
AIO Series 3
AIO Series 5
Welcome to the latest model, 3 Series that can access your PV generation system! With an aid of Samsung SDI AIO 3 Series, you can drastically optimize energy consumption, save space, and reduce maintenance cost. This monitoring system can detect errors in advance and controls the system remotely.
Product Detail View
SAMSUNG

[Figure 7-1: Main page]

	NOTICE
	▪ Note that the URL starts with "http://." ▪ In case your computer, tablet, or smartphone does not support HTML5, it may not operate normally. ▪ Some older smart devices may not operate normally, if its browser version is lower.

2. Enter your ID and password in the login window. If you have no account, please join as a member.

NOTICE

- To install the product, you must obtain an installer membership instead of a general membership.
- To join as an installer member, a special number is required. First check the special number from the local dealer or service center.

3. Click the "Join Membership" link.

4. In order to join as a member, you must consent to the terms for personal privacy protection. The terms have been prepared in accordance with applicable local laws. If you do not agree to the terms, you cannot join as a member.

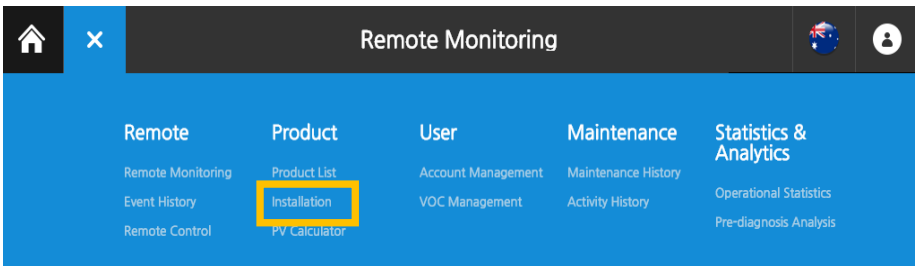
5. Enter the required information for registration.

NOTICE

- The optional items for company name and email address are necessary for quick contact and response from the service center.
- Enter the number identified through a pre-contact in Special Number.

6. After obtaining a membership, a completion message appears. Click the "Log In" button.

7. After login, the main installer page appears. After selecting the menu button at the upper left corner, select Product > Installation.



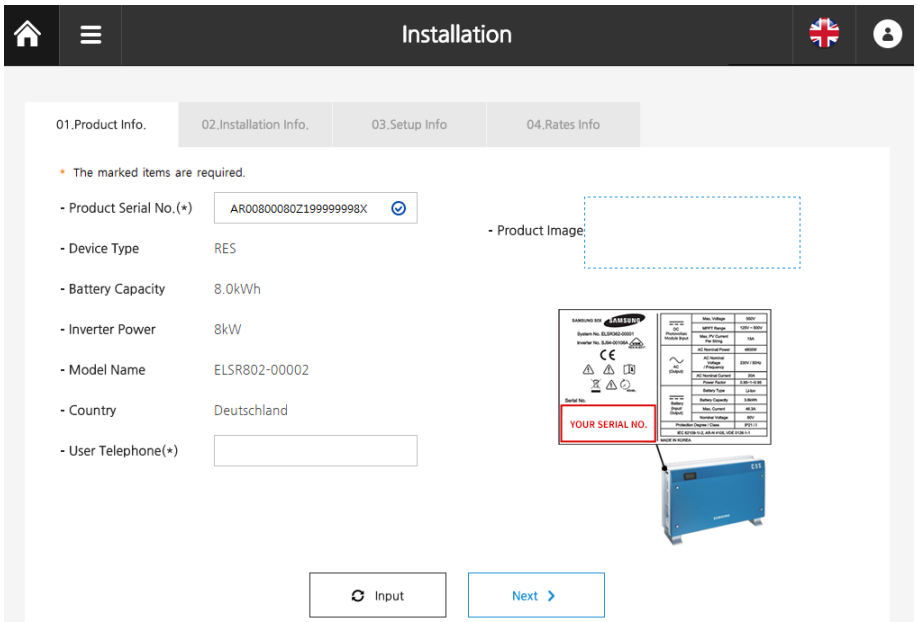
[Figure 7-2: Installer in page]

8. The installation wizard runs automatically. Explain the terms for personal privacy protection to your customer and obtain the consent to the terms with a signature.

NOTICE

- The data collected during the installation process is used only for installation purposes.
- The consent and signature acquisition process proceeds according to the local laws. We at Samsung SDI are making the utmost effort to protect personal information in accordance with the laws.

9. Enter the product information and customer information in Step 1.
The product serial number and user telephone number are required. The product serial number is on the upper area of the cover.

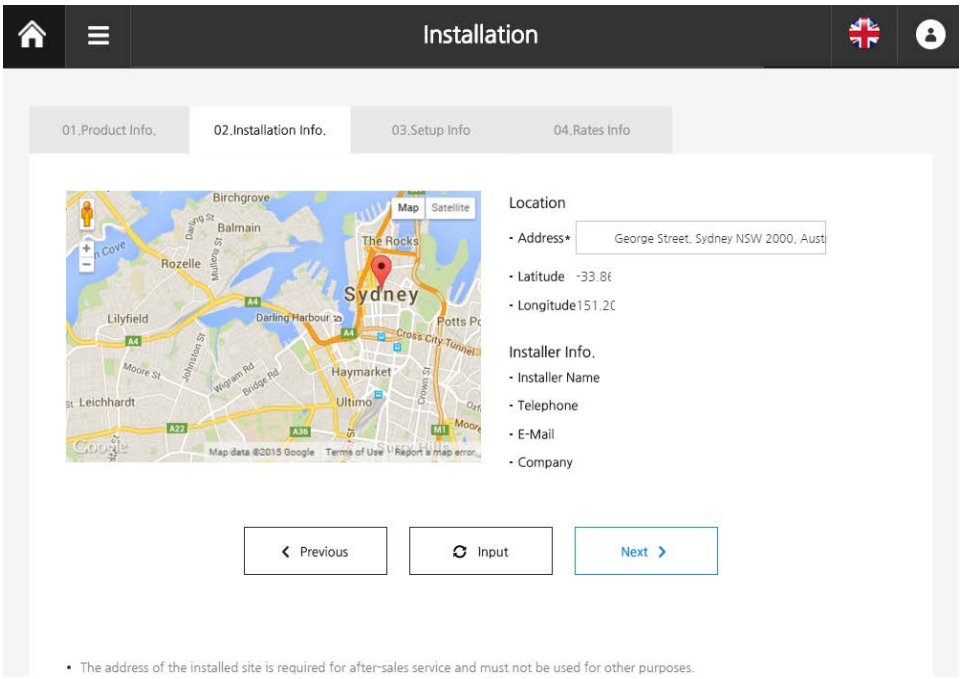


[Figure 7-3: Product Information Entry Screen in Step 1]

NOTICE

- If you enter the product serial number (21 characters), the rest of the information is automatically filled in
- The user telephone number is used for after-sales service purposes.

10. Enter the information of the installation site in Step 2.
In the address input field, enter the address or select the installation site on the map.
After the installation site entry is finished, click the "Next" button.

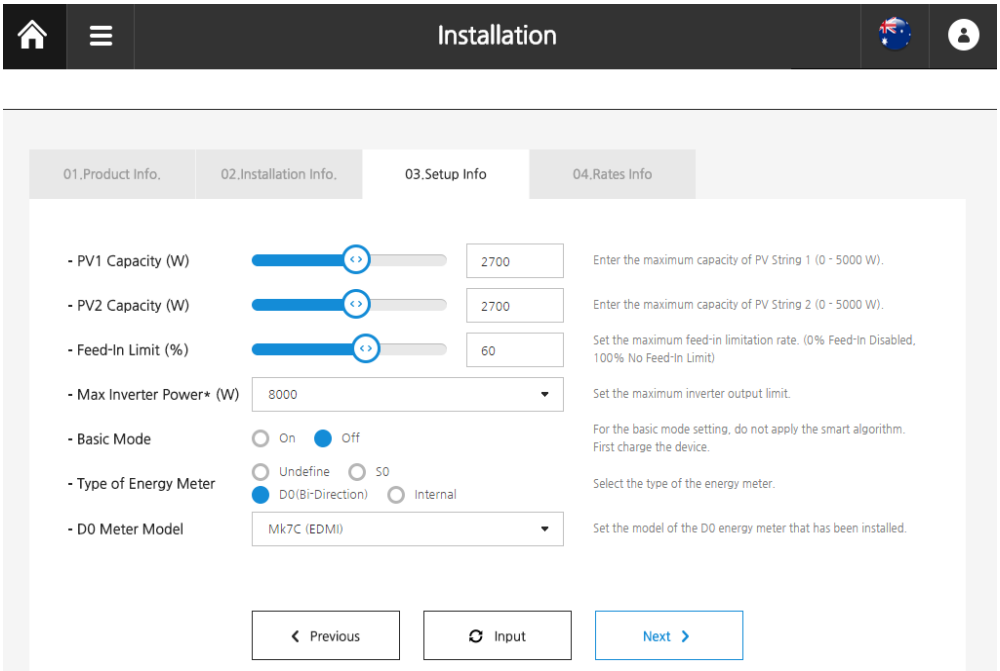


[Figure 7-4: Address Entry in Step 2]

NOTICE

- In the address input box, enter the country and city. It is recommended to move the focus on the map and select the installation site.
- If the location is incorrect, the smart operation algorithm may not operate normally.

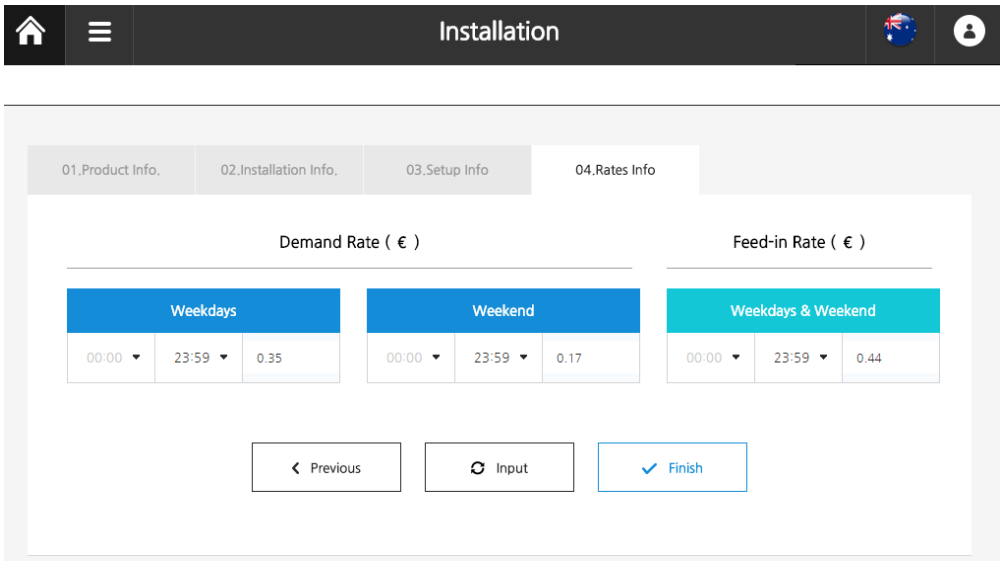
11. Enter the product Setup Information details in Step 3.
Enter values for installed capacities for each PV string, feed-in limit (e.g. 60% in Germany), maximum inverter power, whether or not to use the basic mode, energy meter type, and its model.



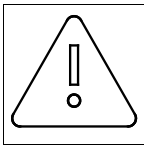
[Figure 7-5: Product Setup Information Details Entry in Step 3]

	CAUTION
	If configuration in this page has errors, it may cause product failure. Accordingly, first check specific installation conditions of the house for accuracy.

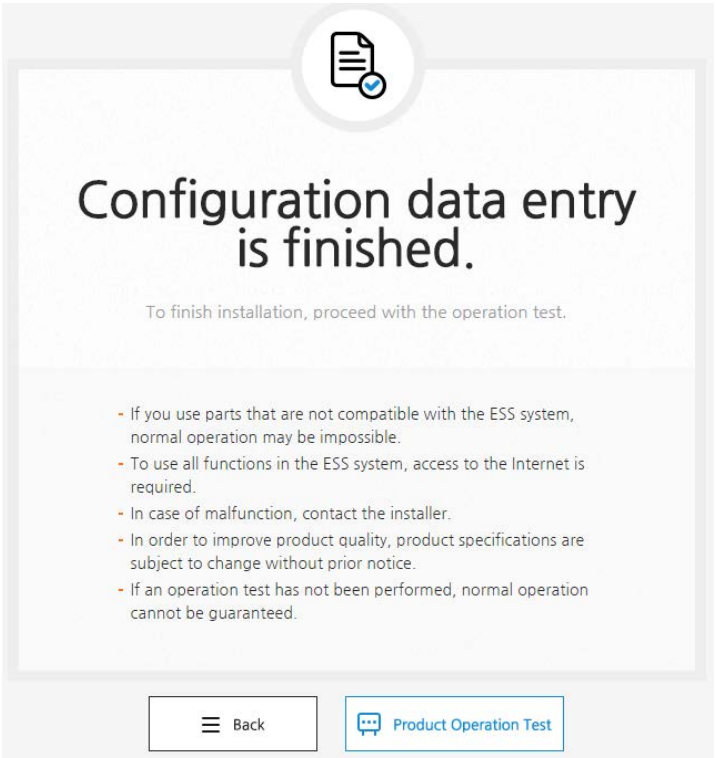
12. Enter the energy rate Information of the house in Step 4.
If a house uses a variable tariff, the charge and discharge operations may differ depending on the input price.
Enter the time-based electricity tariff correctly. If a house uses a fixed payment tariff, the charge and discharge operations are not affected depending on the input price.
The entry of energy price is used only for reference to calculate energy costs and it may not be the same as the actual electricity rate.



[Figure 7-6: Energy Rate Information Entry in Step 4]

	***NOTICE*** The entry of energy price is used only for reference to calculate energy costs and it may not be the same as the actual electricity rate. Samsung SDI will not assume responsibility for incorrect estimated rates.

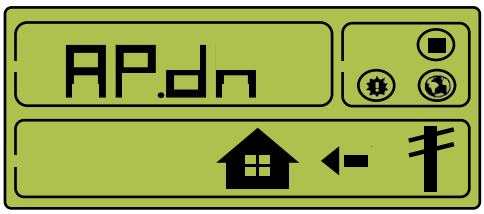
13. End the installation.
If you click the "Done" button, the product monitoring details page appears.
Check whether the login is finished within 2 to 3 minutes. Some products immediately run "Automatic Update."


Configuration data entry is finished.
To finish installation, proceed with the operation test.
- If you use parts that are not compatible with the ESS system, normal operation may be impossible.
- To use all functions in the ESS system, access to the Internet is required.
- In case of malfunction, contact the installer.
- In order to improve product quality, product specifications are subject to change without prior notice.
- If an operation test has not been performed, normal operation cannot be guaranteed.
Back
Product Operation Test

[Figure 7-7: Installation Completion Screen]

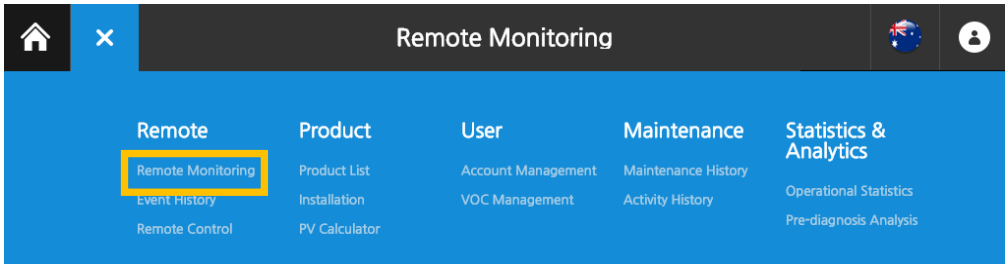
NOTICE

If a firmware update is required, automatic update may run immediately after installation. When "AP.dn" appears on the ESS screen (see the following image), it is recommended to wait a while and not to turn off the power or disconnect the LAN cable. The update usually takes less than 15 minutes. After completion, the automatic login is followed.



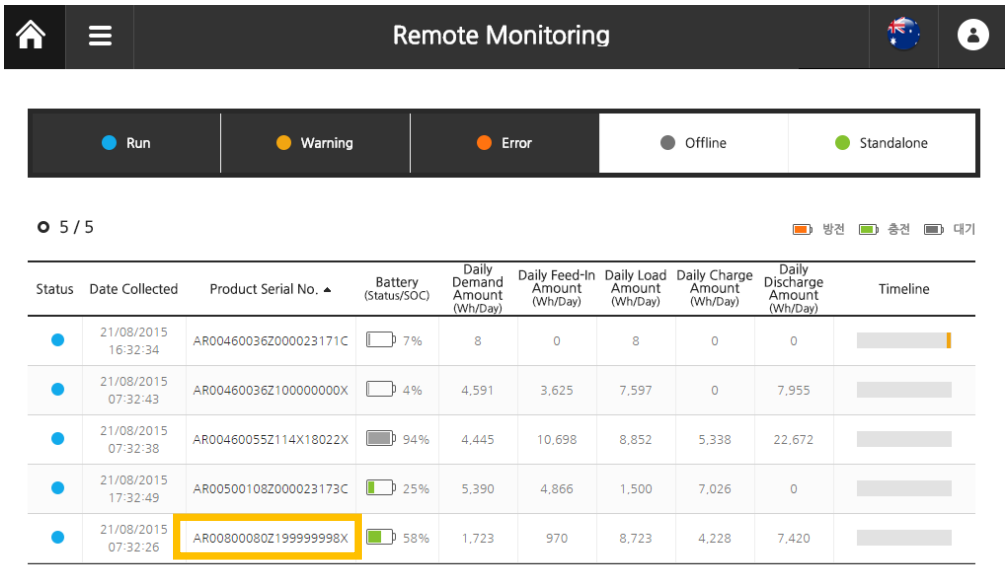
7.3.2 Remote Monitoring

1. In order to check operation status, perform the product test.
   For this purpose, select Remote > Remote Monitoring.

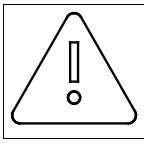


[Figure 7-8: Remote Monitoring Screen]

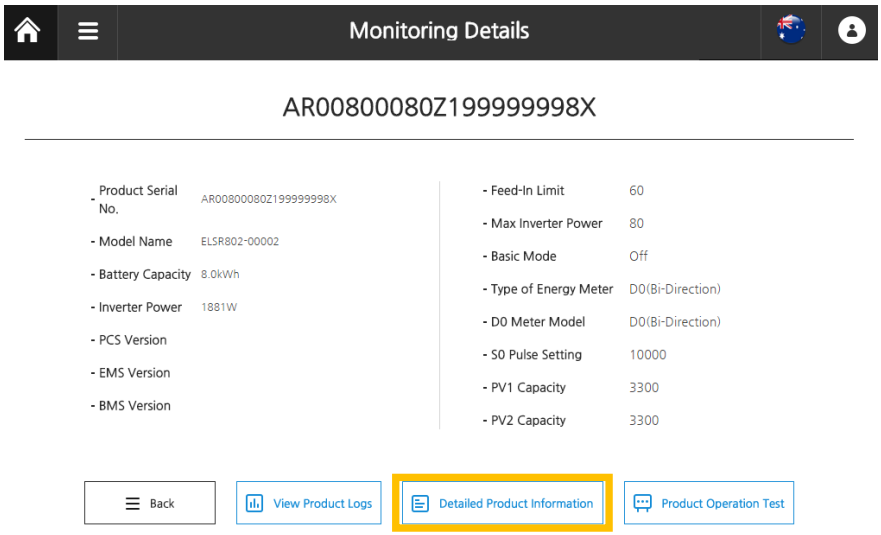
2. When the installed product is in "Run," click the product serial number.



[Figure 7-9: Selection of Product Serial No. to Test]

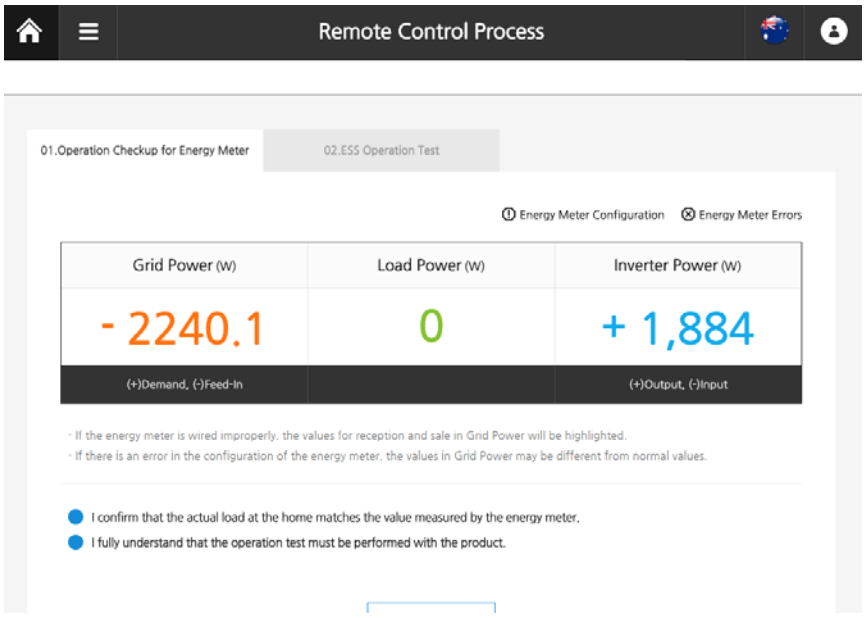
	***NOTICE*** After installation, log in to the remote monitoring takes 2 to 3 minutes.

3. On the product information page, you can check the product information and the basic operation status. Click the "Detailed Product Information" button.



[Figure 7-10: Selection of Detailed Product Information]

4. Check the energy meter operation status. Check whether the values for grid power, load power and inverter power match the values calculated by the energy meter.

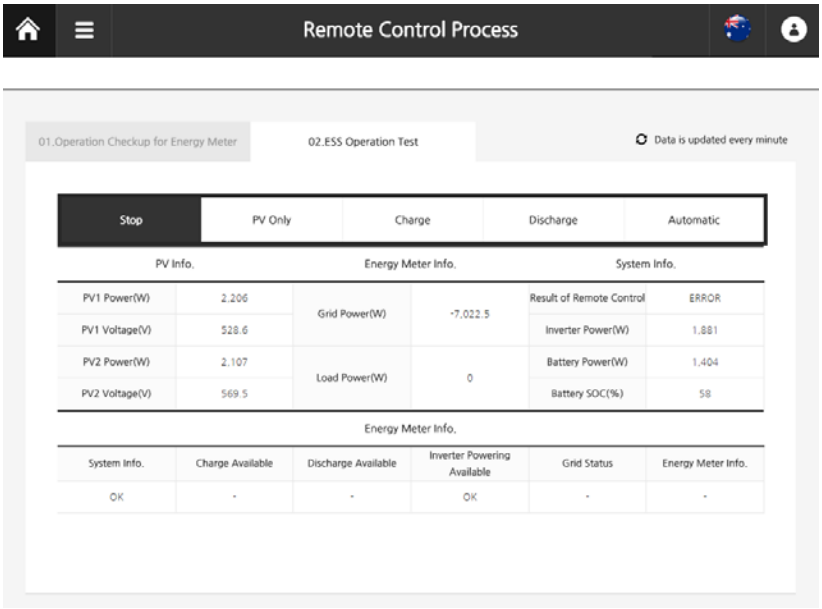

Remote Control Process
01.Operation Checkup for Energy Meter
02.ESS Operation Test
Energy Meter Configuration
Energy Meter Errors
Grid Power (W)
Load Power (W)
Inverter Power (W)
- 2240.1
0
+ 1,884
(+)Demand, (-)Feed-In
(+)Output, (-)Input
If the energy meter is wired improperly, the values for reception and sale in Grid Power will be highlighted.
If there is an error in the configuration of the energy meter, the values in Grid Power may be different from normal values.
I confirm that the actual load at the home matches the value measured by the energy meter.
I fully understand that the operation test must be performed with the product.

[Figure 7-11: Operation checkup for energy meter page]

NOTICE

If the values on the page show a large difference compared to the actual values, you can suspect wiring or configuration issue in the energy meter. If this happens, check the energy meter configuration method and the energy meter installation errors at the upper right corner.

5. Now, perform the ESS operation test.
Perform tests for each item and check whether the tests for each item operate normally.



[Figure 7-12: ESS Operation Test Page]

NOTICE

The tests for the following ESS operation test items may take approximately 2 minutes until they are applied.

a. Stop

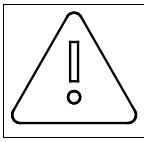
The test stops all ESS operations. This test stops operations, such as PV generation, battery charge/discharge and energy sales/purchase to/from Grid. Check whether all operations for display and measurement stop during the test.

b. PV Only

This test also stops the battery process. The remaining energy is sold to Grid. If the energy for the load is greater than the PV generated energy, the balance is purchased from Grid. For this test, check whether the measurements by PV and Grid are correct.

c. Battery Charge

The test forcibly charges the battery set. For a normal charge test, configure the settings for the target charge energy and SOC using options. Through this test, check whether the energy measurements for the battery set are correct.



NOTICE

When SOC is 95% or higher, charging does not occur. In this case, perform the battery discharge test first.

d. Battery Discharge

The test forcibly discharges the battery set. For a normal discharge test, configure the settings for the target discharge energy and SOC through the options. Through this test, check whether the energy measurements for the battery set are correct.

CAUTION

When SOC is within 5%, perform the battery charge test first. If SOC is too low, the battery life is significantly shortened.

e. Automatic

This test finishes manual tests and automatically starts ESS operations.

CAUTION

To operate the product normally, be sure to perform automatic conversion.

7.4 PC Direct Connection and Local Setting Value

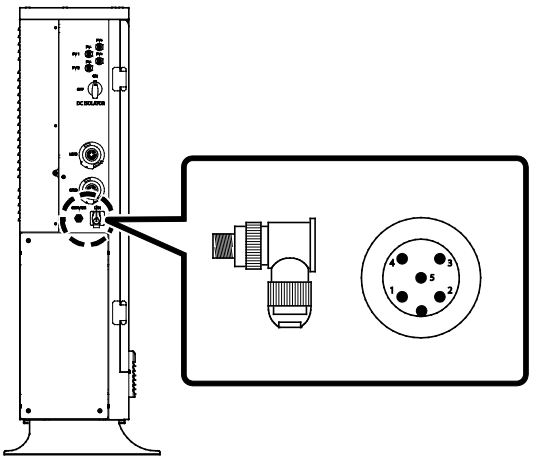
7.4.1 PC Direct Connection Flow

- System Off Status → Insert Jumper Wire, Connect PC LAN cable

  → System AC on → PC Direct Connection → Input Setting Value

  → System off → Remove Jumper Wire → Connect Internet LAN Cable

7.4.2 Inserting Jumper Wire



[Figure 7-13: Jumper]

- Connector Part Name

  EMS OUT_SHORT (MB12MAAFF05RA)

- Manufacturer

  Creken (www.creken.co.kr)

- Pin Map

  Number 3, 4, 5 pins are short type. (Soldering)

7.4.3 LAN Cable Connection between PC and System

7.4.3.1 LAN Cable Type

- UTP cable/category 5E
- 1:1 direct cable

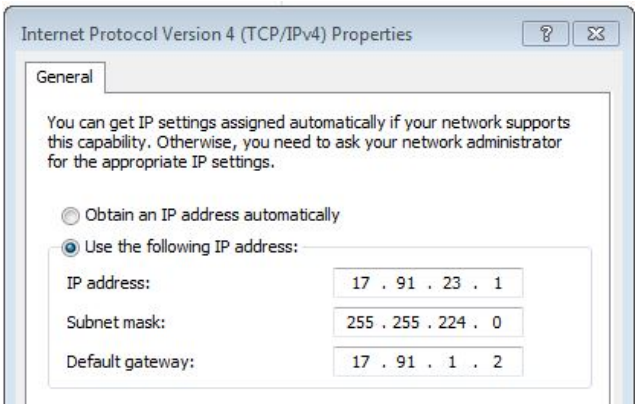
7.4.4 SIM (System Install Manager) Connection

7.4.4.1 To enable direct communication between the computer and the All in One, change the TCP/IP settings on the computer as shown below:

1. Set on your laptop

   [Control Panel → Network and Sharing Center → Change adapter settings → Local Area Connector → Properties → Internet Protocol Version 4 (TCP/Ipv4)]

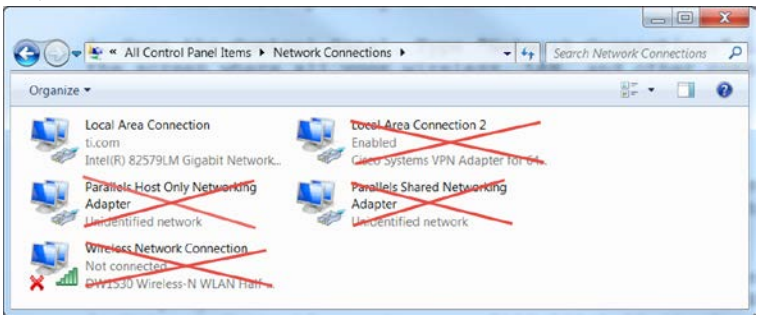
IP address: 17.91.23.1
Subnet mask: 255.255.224.0
Default gateway: 17.91.1.2


Internet Protocol Version 4 (TCP/IPv4) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 17 . 91 . 23 . 1
Subnet mask: 255 . 255 . 224 . 0
Default gateway: 17 . 91 . 1 . 2

[Figure 7-14: TCP/IP setting]

CAUTION

Turn off Wifi.
Only turn on Local Area Connection.



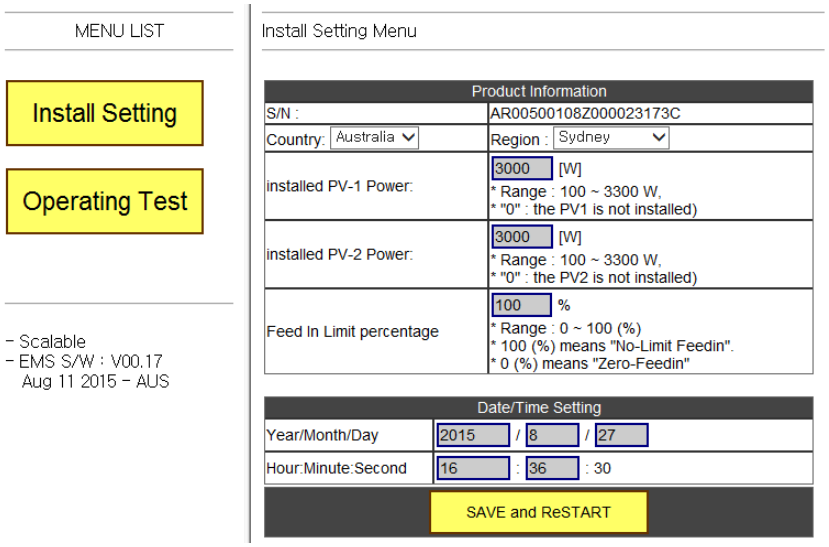
2. Connect the jumper to the connector.
   (* Install Jumper is required, as shown in [Figure 7-13])

3. Connect the LAN cable between AIO and Laptop.
4. Turn the power On (Grid On) and PV S/W On.
5. Access to SIM (System Install Manager)
   http://17.91.23.196:8000
6. Install the settings (shown in [Figure 7-15]).
7. Turn the power Off (Grid Off) and PV S/W Off. → Remove Jumper Wire.
8. Connect Internet LAN Cable.
9. Turn the power On (Grid On) and PV S/W On.

7.4.4.2 Connection URL

- http://17.91.23.196:8000

7.4.4.3 Connection Screen



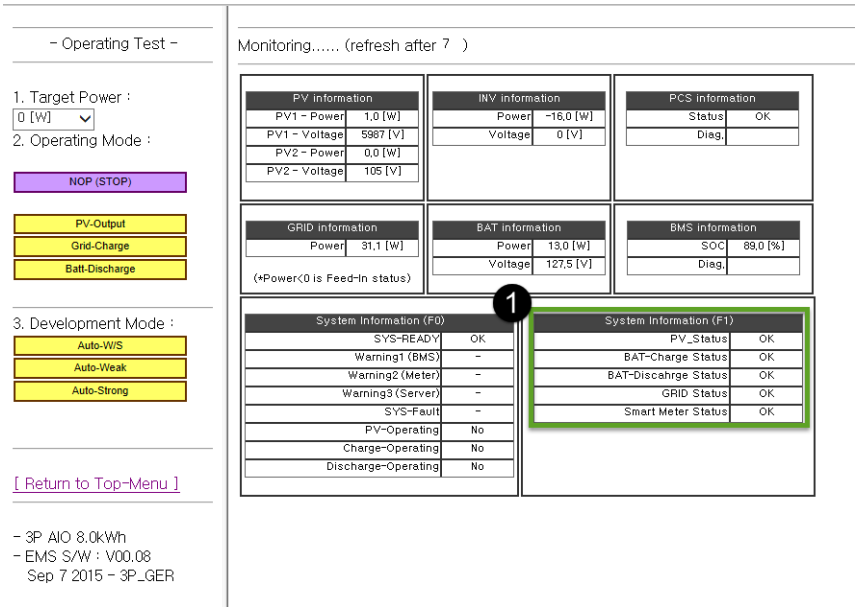
[Figure 7-15: Initial setup page]

7.4.5 Operating test

The test checks whether or not the product has been installed or configured normally.

If any error, checkup is required. For this purpose, first click Operating Test as shown in [Figure 7-15].

7.4.5.1 Operating Test Screen

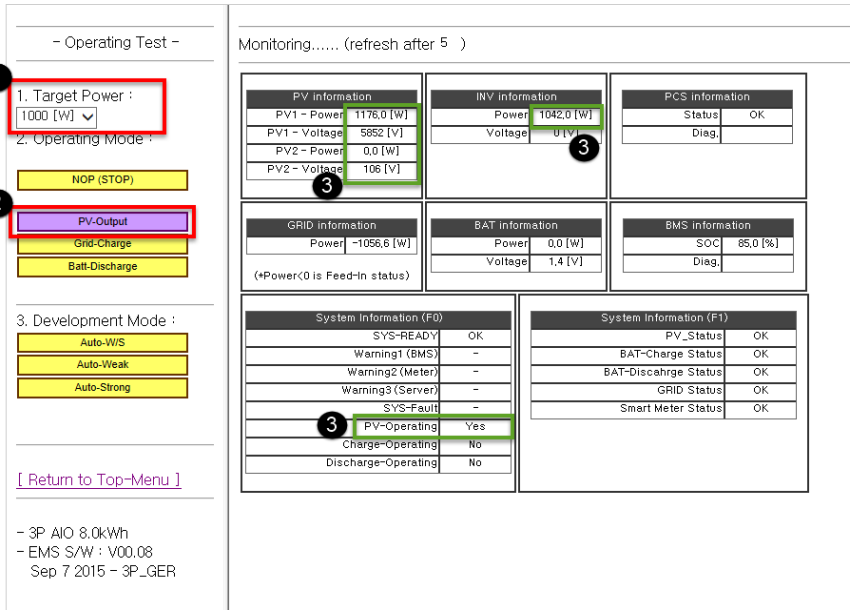


[Figure 7-16: Operating Test Screen]

① Check the system status

Each status is displayed in a rectangular box in [Figure 7-16].
The Battery Status can be activated or deactivated depending on the SOC status.

7.4.5.2 PV-Output Test



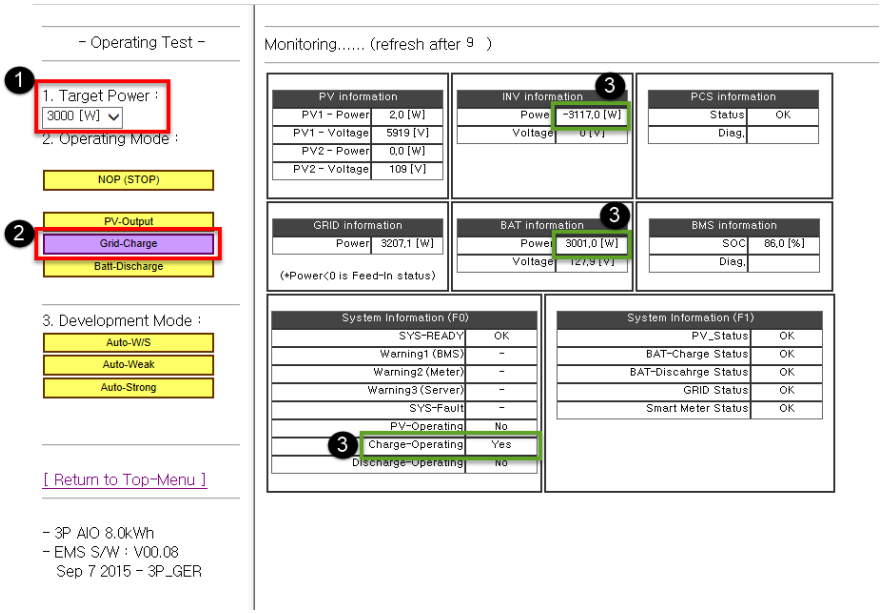
[Figure 7-17: PV-Output Test Screen]

① Set the value for Target Power (e.g. 1000 W).

② Select PV-Output in Operating Mode.

③ Check the PV1, PV2, Inverter Power and Operating Flag.

7.4.5.3 Grid-Charge Test



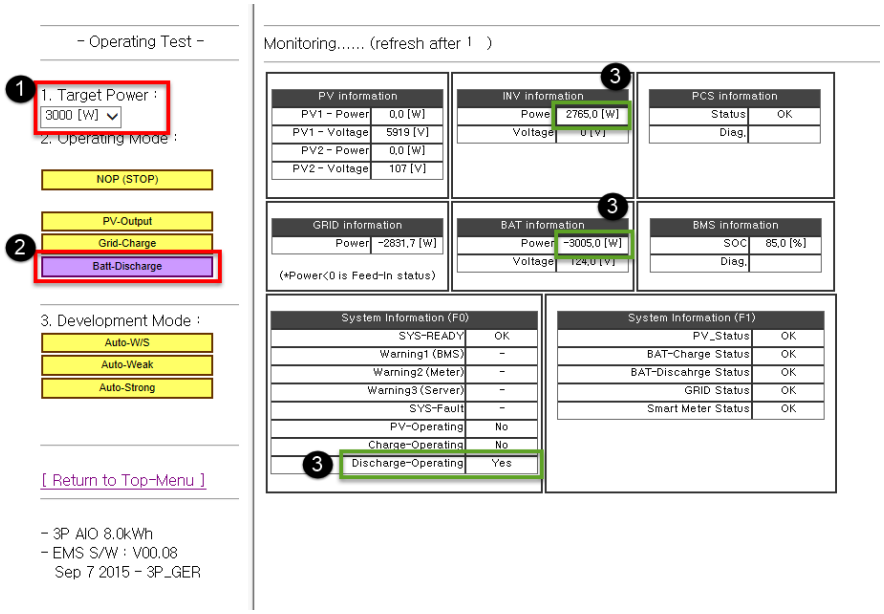
[Figure 7-18: Grid-Charge Test Screen]

① Set the value for Target Power (e.g. 3000 W).

② Select Grid-Charge in Operating Mode.

③ Check the Battery, Inverter Power and Operating Flag.

7.4.5.4 Battery-Discharge Test



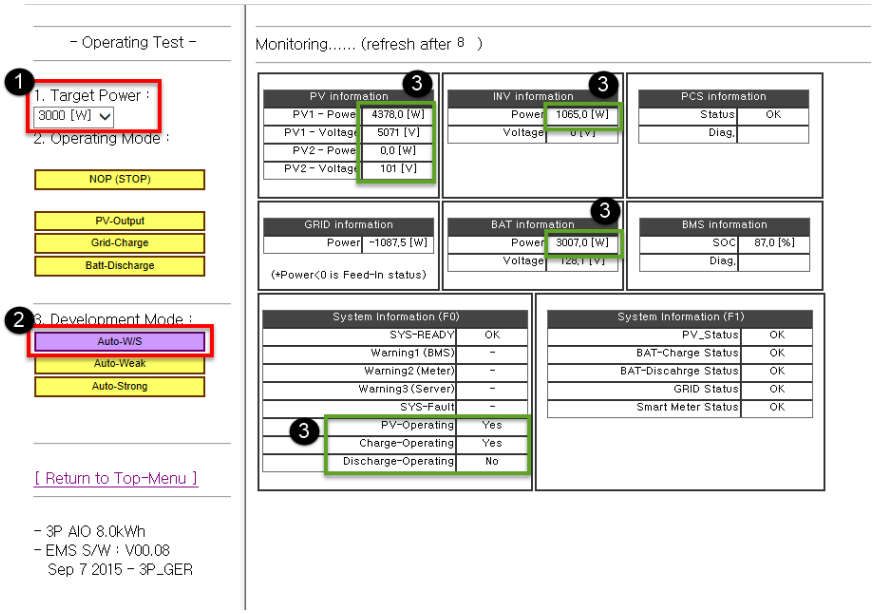
[Figure 7-19: Battery-Discharge Test Screen]

① Set the value for Target Power (e.g. 3000 W).

② Select Batt-Discharge in Operating Mode.

③ Check the Battery, Inverter Power and Operating Flag.

7.4.5.5 Auto-Weak/Strong Test



[Figure 7-20: Auto-Weak/Strong Test Screen]

① Set the value for Target Power (e.g. 3000 W).

② Select Auto-W/S (Weak/Strong) in Operating Mode.

③ Check the PV1, PV2, Battery, Inverter Power and Operating Flag.

	NOTICE
	The Operating Flag may change depending on the status of PV and Battery.

7.4.6 Entering Setting Value

7.4.6.1 S/N

- Enter shipment value from the factory (a subsequent modification is not available.)

7.4.6.2 Region

- Select a city and enter the city name for installation on the menu.

7.4.6.3 PV Install Value

- Enter installation capacity of each PV string.

  Enter by typing by hand.

7.4.6.4 Grid Feed in Limit Regulation Setting

For some countries that have a regulation for the grid feed in limit, the device allows the installer to set up a limit value. You can select the required limit value in the [Feed in Limit Percentage] on the set up screen. The selectable values is 0%, 60%, 70%, 80%, 90%, and unlimited. The term *unlimited* means that is that there is no grid feed-in limit.

7.4.6.5 Date/Time setting

Enter the current date and time

7.4.6.6 Save and Restart

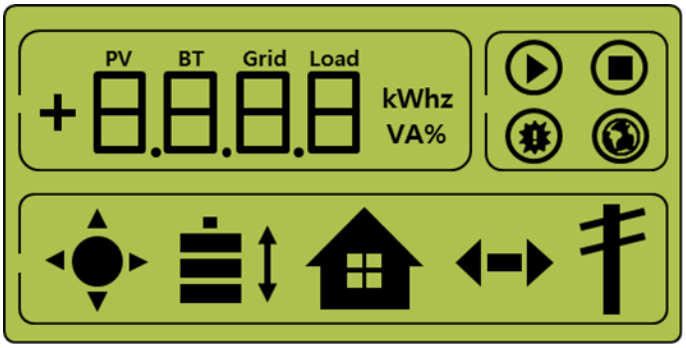
Save onto the system after all the procedures above are completed.

8. Operation Test

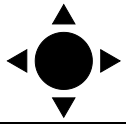
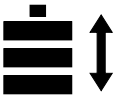
8.1 Starting the System

After completing the installation, turn on the AC circuit breaker and the DC Isolator installed in the distribution box. (See the Section 5.6)

Check the system check message on the front LCD screen.



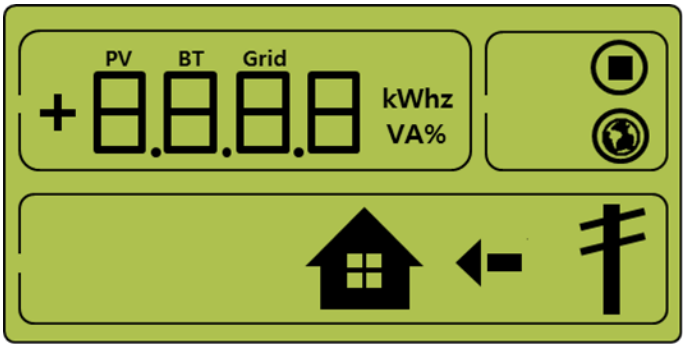
[Figure 8-1: Initial indication screen on power on]

Icon	Displayed	Not Displayed
	System running	System not running
	System stopped/in standby	System not stopped
	Fault occurred	No fault
	EMS running	EMS stopped or not accessible
	PV generating	PV not generating
	1. BATTERY: Normal BMS communication 2. Up arrow: Discharged 3. Down arrow: Charged	1. BATTERY: Abnormal BMS communication 2. Up arrow: Not discharged 3. Down arrow: Not charged
	Always turned on	

	1. Left arrow: Buy from GRID 2. Right arrow: Sell to GRID	1. Left arrow: No purchase from GRID 2. Right arrow: No sale to GRID
	GRID in normal status	GRID in abnormal status (Running standalone)

[Table 8-1: Description of Icons on indication screen]

After finishing the system check, check the system, the PV, and the battery status.



[Figure 8-2: Standby state indication screen before the EMS command]

You will receive the command from the EMS to convert to operation mode.
For individual operation mode screen, refer to 8.3.

8.2 Turning off the System

It is recommended to turn off the DC isolator first and then the manual AC circuit breaker. (If AC is turned off first, the standalone mode starts.)

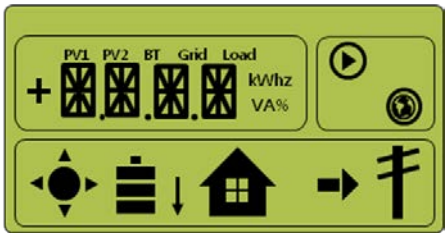
8.3 Descriptions of Operation Mode

This system is composed of six modes: PV Auto, PV Only, Battery discharge, Standby, Maintenance (forced charge), and Stand-alone. The event check status should not be considered as any specific mode.

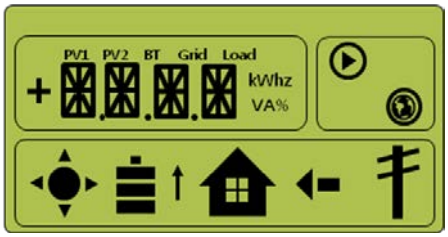
This system is composed of eight modes: PV Auto, PV Only, Battery discharge, Standby, GRID charge, Maintenance (forced charge same as GRID charge), Stand-alone and Self-reliance (PV to battery charge or Battery to LOAD). The event check status should not be considered as any specific mode.

8.3.1 PV-Auto Mode

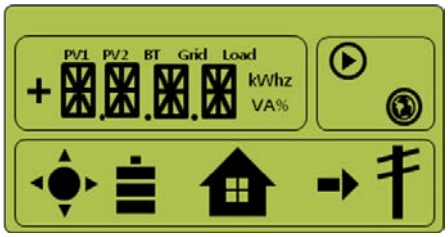
Both solar energy generation and battery charge-discharge are available. The solar-generated power is charged or discharged to the battery based on the EMS decision. A maximum of 4.98 kW or less can be sent to the LOAD and the electric power system.



[Figure 8-3: PV generation, Battery charge, Load use, sell remaining amount]



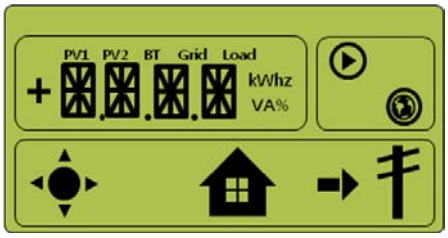
[Figure 8-4: PV generation, Battery discharge, Load use, buy shortage amount]



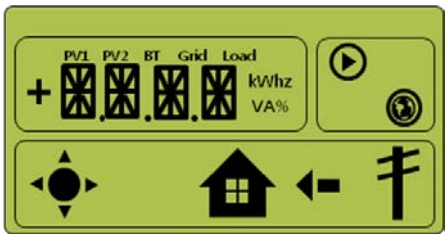
[Figure 8-5: PV generation, Battery standby, Load use, sell remaining amount]

8.3.2 PV-Only Mode

This mode enables the solar energy to be generated. However, the battery charge-discharge does not operate. A maximum of 4.98 kW or less of solar energy generation power can be sent to the LOAD and the system based on the EMS decision.



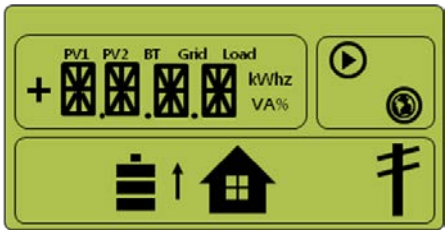
[Figure 8-6: PV generation, Sell remaining amount]



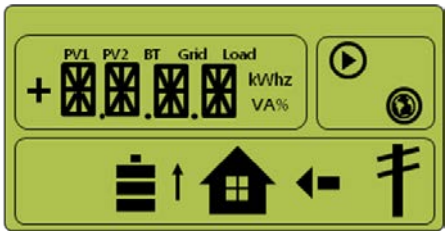
[Figure 8-7: PV generation, Buy shortage amount]

8.3.3 Battery-Discharge Mode

This mode permits of no solar energy generation. Battery discharge is only available on this mode. Based on the EMS decision, the battery discharge power can be sent maximum 4~5 kW or less only to the LOAD.



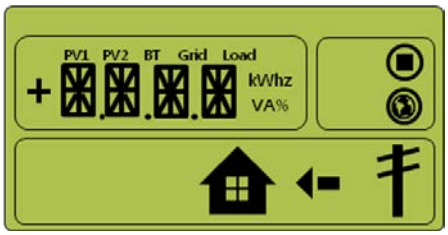
[Figure 8-8: Battery discharge, Load use]



[Figure 8-9: Battery discharge, Load use, Buy shortage amount]

8.3.4 Standby Mode

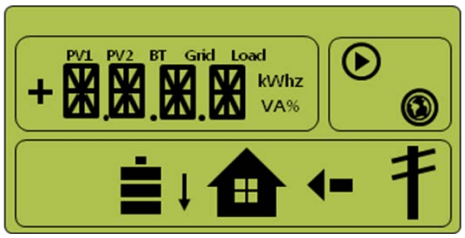
This is the standby mode before converting to operation mode (PV Auto, PV Only, Battery discharge mode). Conversion to the operation mode (PV Auto, PV Only, Battery discharge mode) is made by the EMS decision.



[Figure 8-10: Indication screen on Standby Mode, Buy shortage amount]

8.3.5 Grid-Charge Mode

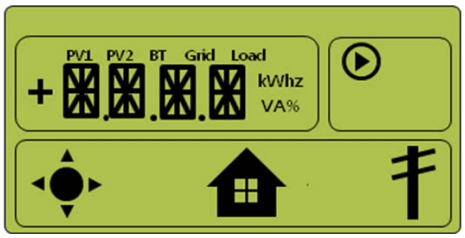
In this mode, solar energy generation is not used, but the power continuously flows from the electric power system to the battery.



[Figure 8-11: Indication screen on Grid charge Mode]

8.3.6 Stand-Alone Mode

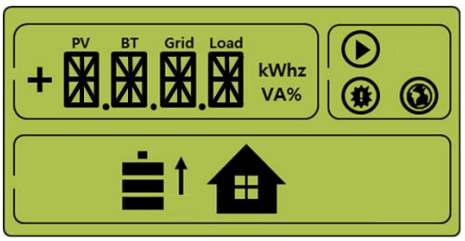
When the All in One is disconnected from the energy meter, or the power conversion system is disconnected from the energy management system (EMS), the All in One system enters into the Stand-Alone Mode. The system operates in a PV- only mode.



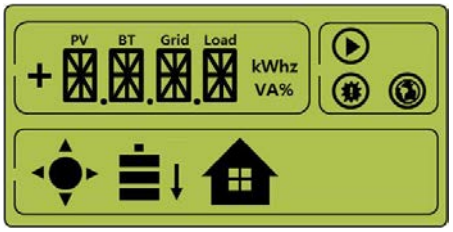
[Figure 8-12: Indication screen on stand-alone mode]

8.3.7 Self-Reliance Mode

When the All in One is disconnected from the grid, the All in One system enters into the Self-Reliance Mode. The system operates in a battery charge or discharge mode.



[Figure 8-13: Indication screen on Self-Reliance mode, Battery to LOAD discharge]



[Figure 8-14: Indication screen on Self-Reliance mode, PV to BATTERY charge (LOW SOC)]

8.3.8 Application Download Mode

[Figure 8-15: Indication screen on Application Download Mode]

9. Problem Confirmation

Checking event codes is available on the website (https://myess.samsungsdi.com).
If the Internet is not available, the event codes cannot be checked.

9.1 General Events

The general events contain warnings and protection.

The warning level events does not stop the generating process. A displayed warning message automatically disappears as soon as the issue is resolved.

When protection level events occur, the product stop the generating process.
The process may automatically resume as long as the issue is resolved.

9.1.1 INVERTER General Events (Warnings)

Type	Code	Code Name	Description
WARNING	E101	Inverter Over Current	An over current has occurred on the DC/AC energy conversion output. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E102	DCL Over Voltage	An over voltage has occurred on the DC-LINK capacitor. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E103	PV #1 Connection Error	Reverse polarity has been detected in the PV #1 connection. Please check the connector.
	E104	PV #2 Connection Error	Reverse polarity has been detected in the PV #2 connection. Please check the connector.
	E105	PV #1 Over Voltage	An over voltage has been detected in the PV #1 input. Please check the PV Array input (< 660 V).
	E106	PV #1 Over Current	Over current has been detected in the PV #1 input. Please contact the after-sales service center for circuit inspection on PV. (goes back to normal status once the error has been cleared.)
	E107	PV #2 Over Voltage	An over voltage has been detected in the PV #2 input. Please check the PV Array input (< 660 V).

Type	Code	Code Name	Description
	E108	PV #2 Over Current	An over current has been detected in the PV #2 input. Please contact the after-sales service center for circuit inspection on PV. (goes back to normal status once the error has been cleared.)
	E109	BDC Over Voltage	A battery over voltage has been detected. Please contact the after-sales service center for battery inspection.
	E110	BDC Over Current	An over current has been detected in the BDC circuit. Please contact the after-sales service center for circuit inspection on BDC. (goes back to normal status once the error has been cleared.)
	E111	Inverter Over Voltage	An over voltage has been detected in the DC/AC output during stand-alone operation. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E114	BDC Under Voltage	A battery low voltage error has been detected. Please contact the after-sales service center for battery inspection.
	E115	DCL Under Voltage	A low voltage error has occurred in the DC-LINK capacitor. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E116	PV Over Temperature	An over temperature has been detected in the PV converter switch. Please check the PV converter circuit and contact the after-sales service center.
	E117	BDC Over Temperature	An over temperature has been detected in the BDC converter switch. Please check the BDC converter circuit and contact the after-sales service center.
	E118	Inverter Over Temperature	An over temperature has been detected in the INVERTER switch. Please check the INVERTER circuit and contact the after-sales service center.
	E119	D12V Over Voltage	An over voltage has been detected in the DC 12V input of the controller. Please contact the after-sales service center for circuit inspection in the auxiliary power unit of the regulator.
	E120	D12V Under Voltage	A low voltage error has been detected in the DC 12V input of the controller. Please

Type	Code	Code Name	Description
			contact the after-sales service center for circuit inspection in the auxiliary power unit of the regulator.
	E122	Inverter Under Voltage	An over voltage has been detected in the DC/AC output during stand-alone operation. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E123	LOAD Over Current	An over current has been detected in the LOAD output terminal. Please decrease the value of the load (< 43 A) connected to the LOAD terminal.
	E125	PV #1 Voltage sensor open	OPEN has been detected in the PV STRING #1 input voltage sensor. Please contact the after-sales service center for sensor circuit inspection.
	E126	PV #2 Voltage sensor open	OPEN has been detected in the PV STRING #2 input voltage sensor. Please contact the after-sales service center for sensor circuit inspection.
	E127	PV #1 Current sensor open	OPEN has been detected in the PV STRING #1 current sensor. Please contact the after-sales service center for sensor circuit inspection.
	E128	PV #2 Current sensor open	OPEN has been detected in the PV STRING #2 current sensor. Please contact the after-sales service center for sensor circuit inspection.
	E129	Inverter Over Power	Power Over has been detected in the inverter output. It may be caused by temporary or rapid LOAD (< 5500 W) changes. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E130	LOAD Reverse Current	A reverse current has been detected in the LOAD output terminal. Please check if the electric power generator is connected to the LOAD terminal.
	E131	LOAD OVER (WARNING)	An over current has been detected in the LOAD output terminal. (Warning) Please decrease the value of the load connected to the LOAD terminal.

[Table 9-1: Inverter general events warning list]

9.1.2 System General Events (Protection)

Type	Code	Code Name	Description
	E410	DIC Communication Error	An error has occurred while in internal communication of the controller. Please contact the after-sales service center.
	E411	uEMS Communication Error	An error has occurred during communication between the EMS board and the controller. Please contact the after-sales service center for inspection on the communication circuit or connection.
	E448	AC Relay Check Error	A fusion has been detected in the AC relay (INVERTER or GRID side). Please contact the after-sales service center for relay inspection.
	E455	PV_INVERTER part initialization fail	The internal initialization for the PV_INVERTER controller failed. Please contact the after-sales service center.
	E456	BDC to DC-LINK Voltage charge fail	The DC-LINK voltage charging has malfunctioned in the BDC (using BATTERY). Please contact the after-sales service center.
	E458	PV_INVT Logic fail	The inner sequence (LOGIC) process of the PV_INVT DSP failed. Please contact the after-sales service center.
	E459	BATTERY Short	A battery shortage has been detected. Please check the battery connection. If the problem continues after inspection, please contact the after-sales service center.
	E460	DC-Breaker switch OFF	OFF has been detected while in operation in the DC-Breaker switch. Please check the switch.
	E461	BDC Logic fail	The inner sequence (LOGIC) process of the BDC DSP failed. Please contact the after-sales service center.
	E462	BDC part initialization fail	The internal initialization in the BDC controller failed. Please contact the after-sales service center.
	E463	BATTERY Reverse connection	A reverse battery connection has been detected. Please check the battery connection. If the problem continues after inspection, please contact the after-sales service center.
	E464	BATTERY & AFE Differential Voltage	A deviation has been detected between the BATTERY input terminal and BMS voltage measurement. Please contact the after-sales service center after checking the actual voltage and measurement of the battery.

Type	Code	Code Name	Description
	E465	BATTERY Voltage sensor open	OPEN has been detected in the BATTERY voltage sensor. Please contact the after-sales service center.
	E466	BDC #1 Current sensor open	OPEN has been detected in the BDC STRING #1 current sensor. Please contact the after-sales service center.
	E467	BDC #2 Current sensor open	OPEN has been detected in the BDC STRING #2 current sensor. Please contact the after-sales service center.
Warning	E468	DIC Communication Error (Warning)	An error has occurred while in internal communication of the controller. Please contact the after-sales service center.

[Table 9-2: System general events protection list]

9.1.3 BMS General Events

Type	Code	Code Name	Description
Warning	E501	Cell Over Voltage	An over voltage has been detected in the BATTERY Cell. Please check the battery.
Fault	E502	Cell Over Voltage	An over voltage has been detected in the BATTERY Cell. Please contact the after-sales service center for battery inspection.
Warning	E503	Cell Under Voltage	A low voltage error has been detected in the BATTERY Cell. Please check the battery.
Fault	E504	Cell Under Voltage	A low voltage error has been detected in the BATTERY Cell. Please contact the after-sales service center for battery inspection.
Warning	E505	Cell Over Temperature	An over temperature has been detected in the BATTERY Tray. Please check the battery.
Fault	E506	Cell Over Temperature	An over temperature has been detected in the BATTERY Tray. Please contact the after-sales service center for battery inspection.
Warning	E507	Cell Under Temperature	A low temperature error has been detected in the BATTERY Tray. Please check the battery.
Warning	E509	Cell Voltage Imbalancing	A voltage deviation has been detected in the BATTERY Cell. Please contact the after-sales service center for battery inspection.
	E511	AFE Communication Error	A communication error has occurred between the BDC's DSP and the BMS board. Please contact the after-sales service center for inspection on the connection wire or BMS board.

Type	Code	Code Name	Description
	E520	TOTAL Voltage Over (@ BMS (AFE))	An over voltage has been detected in the battery measured in BMS. Please contact the after-sales service center for inspection on the battery and BMS.
	E521	TOTAL Voltage Under (@ BMS (AFE))	A low voltage error has been detected in the battery measured in BMS. Please contact the after-sales service center for inspection on the battery and BMS.
	E524	Cell Temperature sensor broken	Errors in 2 or more temperature sensors in the BATTERY Tray have been detected. Please check the battery. Please contact the after-sales service center.
Warning	E525	AFE Communication Error	A communication error has occurred between the BDC's DSP and the BMS board. Please contact the after-sales service center for inspection on the connection wire or BMS board.
Warning	E526	Cell Imbalance Temperature	A temperature measurement deviation has occurred in the BATTERY tray. Please contact the after-sales service center for battery inspection.

[Table 9-3: BMS general events list]

9.1.4 EMS/Communication Events

Type	Code	Code Name	Description
	E601	PCS Communication Error	An error has occurred during communication between the EMS board and the controller. Please contact the after-sales service center for inspection on the communication circuit or connection.
	E602	Ethernet Communication Error	A communication error has occurred on the external Ethernet of the EMS board. Please contact the after-sales service center for inspection on the communication circuit or connection.
	E603	Energy Meter Communication Error	A communication error has occurred in the EMS board and the embedded energy meter. Please contact the after-sales service center for inspection on the communication circuit or connection.

[Table 9-4: EMS/communication events list]

9.1.5 Single Fault Events

Type	Code	Code Name	Description
WARNING	E701	Grid Under Voltage	A low voltage error has been detected in the GRID. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E702	Grid Over Voltage	An over voltage has been detected in the GRID. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E703	Grid Under Frequency	A low frequency error has been detected in the GRID. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E704	Grid Over Frequency	An over frequency has been detected in the GRID. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E706	RCMU Over Current	A leakage has been detected in the internal inverter output of the system. Please contact the after-sales service center

Type	Code	Code Name	Description
	E708	PV Insulation Error	An error has been detected in the insulation resistance of the PV input. Please contact the after-sales service center for inspection on the PV Array and connection.
	E709	Grid Anti-islanding	An error has been detected in the GRID (Anti-Islanding situation). If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E710	Function Safety Error	A deviation has been detected in the PV_INVT and BDC. Please contact the after-sales service center.

[Table 9-5: Single fault events list]

9.2 Significant Events

If a significant event is notified, the system is set to stop operation. If that is the case, contact your installer to restore the system to normal operation.

Type	Code	Description	Measures
Significant	E912	PCS Permanent Error	Consecutive errors have been detected in the PV_INVERTER. Please contact the after-sales service center.
	E913	BDC Permanent Error	Consecutive errors have been detected in the BDC. Please contact the after-sales service center.
	E914	INVERTER Current Over (Trip-zone, @INVT)	An over current surge has been detected in the DC/AC energy conversion output of the PV_INVERTER controller. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E915	DC-LINK Voltage Over (Trip-zone, @INVT)	An over current surge has been detected in the DC-LINK capacitor of the PV_INVERTER controller. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E916	INVERTER Current Over (Trip-zone, @BDC)	An over current surge has been detected in the DC/AC energy conversion output of the BDC controller. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E917	DC-LINK Voltage Over (Trip-zone, @BDC)	An over voltage surge has been detected in the DC-LINK capacitor of the BDC controller. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)
	E918	BDC STRING #1 CurrentOver (Trip-zone, @BDC)	An over current surge has been detected in the BDC converter #1 of the BDC controller. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)

Type	Code	Description	Measures
	E919	BDC STRING #2 CurrentOver (Trip-zone, @BDC)	An over current surge has been detected in the BDC converter #2 of the BDC controller. If the problem continues, please contact the after-sales service center. (goes back to normal status once the error has been cleared.)

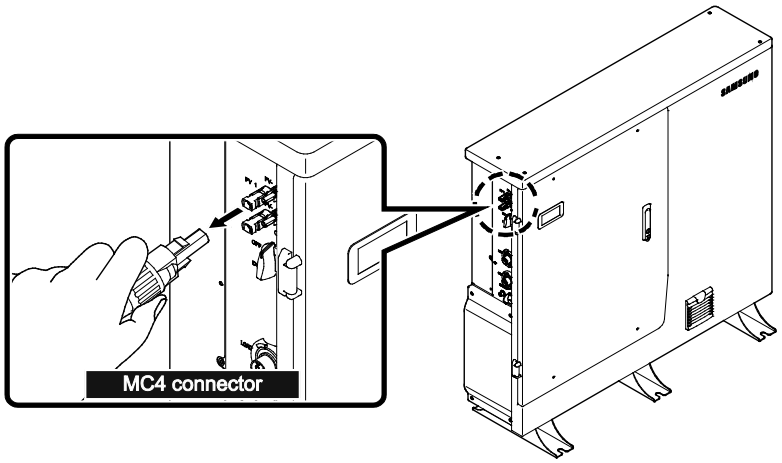
[Table 9-6: Significant events list]

10. Maintenance

10.1 Cleaning the Fan and the Cover

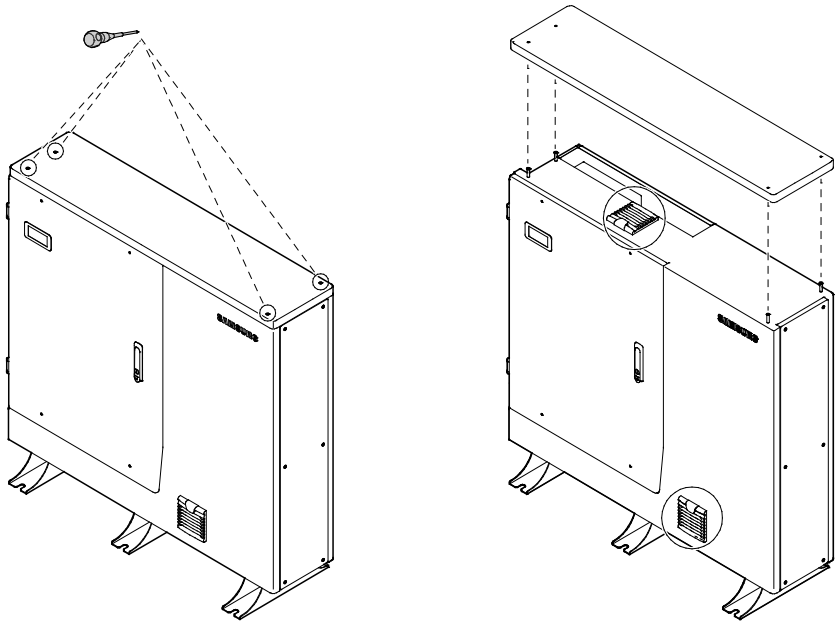
	NOTICE
	Qualified Person Only!

Refer to the following procedures and check the fan when error code E005 is shown. If the fan is covered with dirty particles, clean the fan as guided in this chapter. Turn off the AC circuit breaker and the DC Isolator in the distribution box, then separate the Photovoltaic MC4 connector from the connector located on the side of the Scalable All in One.



[Figure 10-1: PV MC4 connector]

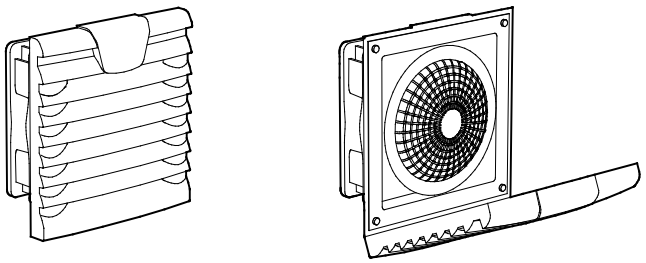
DC Isolator off and Removal of the Photovoltaic MC4 Connector



[Figure 10-2: Upper cover removal]

When the top cover is removed, clean 2 pint the filter and fan by using a smooth brush, paint brush, or wet cloth. Show figure

Remove the fan connector.



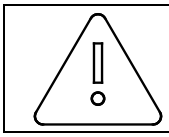
[Figure 10-3: Fan removal]

Clean the filter and fan with a smooth brush or a wet cloth.

	NOTICE
	Using compressed air may damage the fan. When cleaning the fan, do not use compressed air. It may damage the fan.

When the fan is cleaned, assemble all the components in the in reverse order.

10.2 Checking and Exchanging Various Components



NOTICE

Qualified Person Only!

10.2.1 Fuse Check

Check the fuse when the device fails to work with significant error (E9XX).

Do not perform Fuse Check when the device is working.

Check the fuse after turning off the DC Isolator and the AC circuit breaker.

Measure the resistance value between CN5 and CN4 of the Inverter PBA (Specify in code when numbering the code in the future), CN2 and CN3 of the DC PBA (Specify in code when numbering the code in the future)

If the resistance value is open state (Mega ohms or Infinite value), perform PBA exchange.

10.2.2 Input / Output Terminal Check

Check the input / output terminal when the device fails to work with significant errors (E9XX).

Check the input / output terminal after turning off the AC circuit breaker and DC Isolator.

Do not perform the check when the device is working.

Measure the input / output terminal with a multi-meter.

PV1 input (SJ92-01426A): CN26, CN27

PV2 input (SJ92-01427A): CN28, CN27

Battery input: CN12, CN13

AC input: CN22, CN23

ESS Load output: CN18, CN19

Normal outlet: CN20, CN21

If the resistance value is in a short state (close to 0), perform PBA exchange.

10.2.3 DC Link Check

Check the DC Link when the device fails to work with E102.

Check the DC Link after turning off the AC circuit breaker and DC Isolator.

In the first instance, disconnect the cable of connector. You can disconnect the cable to prick neighborhood hole of the cable with narrow stick.

Measure between connectors (CN46 and CN47, CN47 and CN48, CN49 and CN50, CN50 and CN51, CN50 and CN52, CN50 and CN53) of the SW PBA (SJ92-01428A)) with a multi-meter to check the resistance value.

If the resistance value is close to zero, perform PBA exchange.

10.2.4 FAN Operation Check

Check FAN operation when the device fails to work with E005.

Check the FAN operation as frequently as possible. Failure to do so may cause fatal damage to the device.

Perform PV Auto Mode to check whether both fans are working properly.

If the fans are not working properly, contact the installer.

10.3 Battery Maintenance

CAUTION

All work or service on the ESS and electrical connections must be supervised by personnel knowledgeable about batteries and the required precautions.

When replacing battery trays, replace old ones with the same type and number of batteries or battery packs (Check the type label or serial numbers/model numbers on battery trays).

40-minute standby period of time to complete discharging in the system before testing electrical parts inside the system!

Do not dispose of batteries in a fire. The batteries may explode.

Do not open or damage batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when handling batteries.

Remove watches, rings, or other metallic objects.

Use tools with insulated handles.

Wear rubber gloves, eye protection glasses and boots when working with the battery systems.

Do not lay tools or metal parts on top of batteries.

Disconnect charging source prior to connecting or disconnecting battery terminals.

Determine if the battery is inadvertently grounded. If that is the case, separate battery from ground Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

10.3.1 Checking Battery Problem

When you check the event message (as noted in Chapter 9), check whether it is a significant event that informs the battery system (subsection 9.2: significant event E901~E910).

If it is a significant event, contact the installer or the maintenance personnel.

If it is a significant event message related to the failure, exchange the battery. However, battery exchange is permitted only to the qualified personnel.

The battery exchange procedure is as described in Subsection 10.3.2.

10.3.2 Battery Exchange Procedure

Separate the external electrical / communication connection line as guided below before the battery exchange.

For electrical connection of the main body, turn off the AC circuit breaker and the DC Isolator in the distribution box and the All in One System to remove the power.

For the MC4 connector connected to the Photovoltaic source, separate the male terminal from the female terminal.

Remove the AC cable from the connector block in the AC line.

Remove the LAN communication cable.

To complete discharging in the main system, wait for 40 minutes. Remove the side cover of the enclosure as described in Chapter 5.

Separate the battery tray from the system. Reverse order of the installation process.

Unfasten the screw on the battery tray to remove it from the main body.

Pull the battery tray out to separate it from the main body.

Place the main body and the battery tray on the packing box. This process is the reverse order of the installation process.

10.4 The List of Replaceable Parts

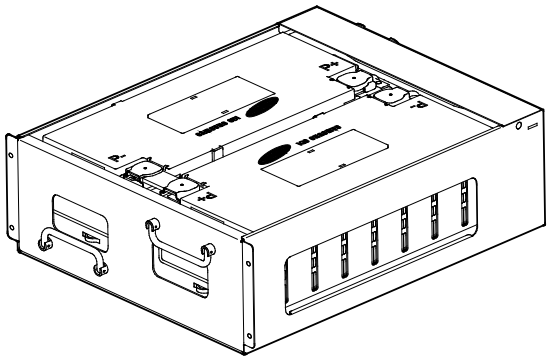
The [Table 10-1] shows the list of parts replaceable for maintenance of this system.
For the parts other than presented here, please refer to the application notes linked on the SAMSUNG SDI website, or contact the installer or the service center.

No.	Part Name	Manufacturer	Part number
1	Scalable Battery Tray	SAMSUNG SDI	ELPT362-00004
2	PV connector	Multi-Contact AG c/o Stäubli Group	PV STICK
3	Wire Fan Assy	SunIn, Dongyang	SJ39-00503A
4	Filter	RITTAL	RITTAL 3237.124

[Table 10-1: Replaceable parts list]

10.4.1 Li-Ion Battery Tray

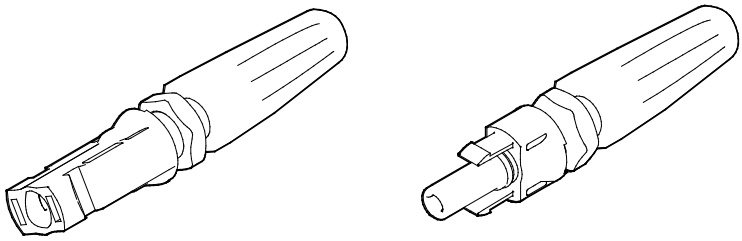
The Li-Ion battery module can be replaced if it fails to work properly. The Scalable system uses a battery tray with a 2-battery module manufactured by SAMSUNG SDI. When you have to replace the battery module, please contact SAMSUNG SDI and provide the item's name and the serial number of the Scalable All in One system.



[Figure 10-4: Li-Ion Battery tray (manufactured by SAMSUNG SDI)]

10.4.2 PV Connector

The PV connector can be replaced when it is damaged. The PV connector used in the Scalable All in One system consists of a PV stick with male/female parts manufactured by Multi-Contact AG c/o Stäubli Group.



[Figure 10-5: PV Connector (MC4)]

10.4.3 FAN

In the All in One System, FAN provide air circulation to maintain and regulate the system temperature. The fan can be replaced when they reach the end of their operational life span or fail to work properly. If that is the case, the installer or the maintenance personnel will identify its cause of malfunction and will replace it. The replacement method may depend on the local maintenance conditions. The manufacturer's name and the model number of the fan are as follows: SunIn/DongYang FAN, Wire Fan Assy, SJ39-00503A. For further details, please refer to the Maintenance Manual or contact SAMSUNG SDI Service. The contact address is described in Chapter 13.

11.Technical Specifications

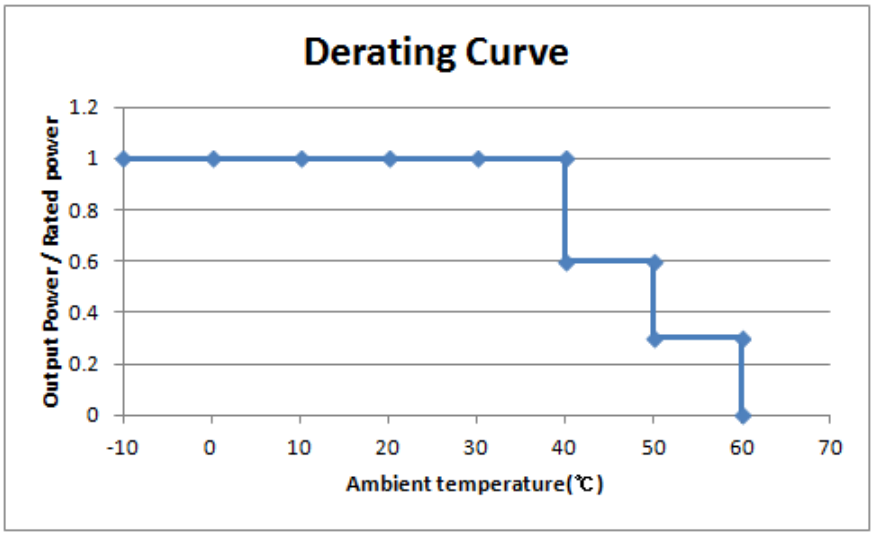
PV Data (DC)		
Max. input total power	6.6 kWp	
Max. input power per string	3.3 kWp	
Max. input voltage	550 V	
Min. input voltage/Initial input voltage	125 V/150 V	
MPPT voltage range	125 V~500 V	
Max. input current per string	15 A	
Max. input short circuit current for each MPPT	20 A	
Max. inverter back feed current to the array	Negligible	
Number of independent MPP trackers	2	
Number of DC inputs pairs for each MPPT	2	
Connection type	MC4	
Battery Data (DC)		
System Model No.	ELSR722-00004	ELSR103-00001
Battery rated capacity	7.2 kWh	10.8 kWh
Battery usable capacity	6.48 kWh	9.72 kWh
Discharge of depth (DOD)	90 % (6000 cycles, 5 ~ 95%)	
Battery technology	Li-Ion	
Battery voltage range/nominal voltage	96~132 V/ 120V	145~198 V/ 180V
Battery Max. current	46 A	38 A
Battery nominal current	33.3 A	27.8A
Nominal DC/DC power	4.0 kW	4.98 kW
Grid Data (AC)		
Rated voltage/range	230 V/200 V~270 V	
Rated power frequency/range	50 Hz/47.5 Hz ~51.5 Hz	
Rated output power	4.98 kW	
Rated output current	22 A	
Max. input Power	8 kW	
Max. input current	35 A	
Max. output over-current protection	35.3 A	
Max. allowed output current for fuse protection	32 A	
Adjustable power factor range	0.8un~1~0.8ov	
Feed-in phases/connection phases	1/1	
Total Harmonic Distortion. (Total harmonic factor of the output current	<5 %	

with total harmonic factor of the AC voltage < 2%, and AC power > 50% of the rated power)		
Emergency Power Supply (LOAD)		
Rated voltage	230 Vac	
Rated Frequency	50 Hz	
Rated current	17.4 A	22 A
Rated power	4 kW	4.98kW
Feed in type	Single-phase	
Efficiency (PV to Grid)		
European efficiency	96 %	
Max. efficiency	97 %	
Protective Device	Yes	
DC disconnection device for PV	Yes	
Ground-fault monitoring(RCMU)/grid monitoring	Yes/Yes	
General Data		
Dimensions (W/H/D)	1200/1140/280 mm	
Weight	104 / 44.9 kg	
Protective class (I, II, III)	Class I	
Degree of protection	IP54	
Max. permissible value for relative humidity	95 % (non-condensing)	
Operating temperature	-10~40° C	
Storage temperature	-20~60° C	
Noise emission	≤50dB(A) @ 1m	
Over voltage category	III	
Features		
Display	Custom LCD	
Communication	LAN, RS485	
Energy management system	Integrated	
Certificates and approvals	IEC62109-1/2 AS/NZS 3100, AS4777.2/3, CE	

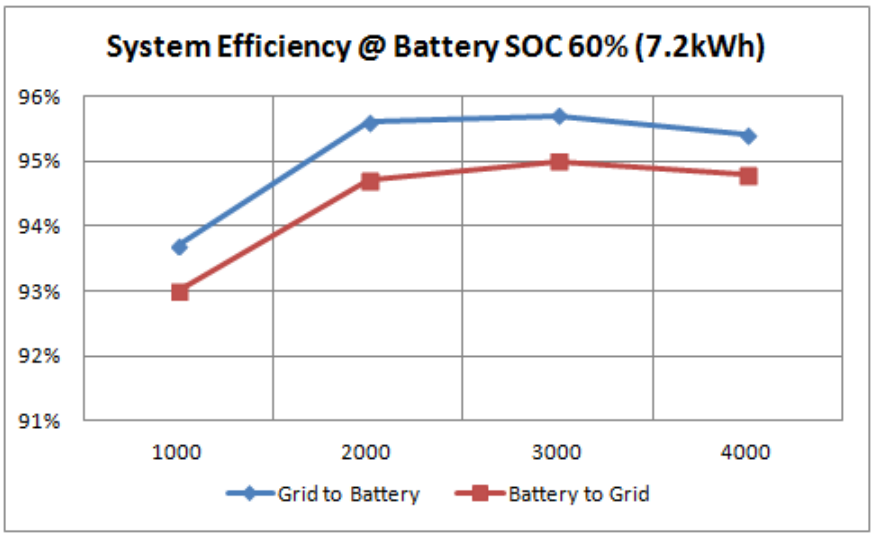
Item	Specification	
Product name	Battery Cell	Battery Tray
Type/model	CM0630B0002G	ELPT362-00004
Nominal voltage	3.75V	60V
Rated capacity	63Ah	60Ah
Recommended charging voltage by manufacturer	4.12V	65.92V
Upper limit charging voltage	4.12V	-
Recommended charging current by manufacturer	21A	21A
Maximum charging current	150A	38A (model no. ELSR103-00001) 46A (model no. ELSR722-00004)
Charging temp. upper limit	65°C	65°C
Charging temp. lower limit	-40°C	-20°C
Standard charging method by manufacturer	Charge at constant current 21A until voltage reaches 4.12V, then charge at constant voltage 4.12V till charge current is 1.2A.	Charge at constant current 21A until voltage reaches 65.92V, then charge at constant voltage 65.92V till charge current is 3.15A.
Charging procedure for internal short-circuit test	Charge at constant current 150A until voltage reaches 4.12V, then charge at constant voltage 4.12V till charge current is 0.05C (3.15A).	-
Maximum discharge Current	120 A	38 A (model no. ELSR103-00001) 46 A (model no. ELSR722-00004)
Final discharge voltage	2.7 V	43.2 V
Dimension	(45.6±0.4) mm × (173.9±0.3) mm × (125.7±0.4) mm	(160.3±2) mm × (408.3±2) mm × (513.8±2) mm
Weight	(1900±100) g	(44.9±0.5) kg

Remark:
1. The sample is battery tray used in energy storage applications. It consists of 2S modules, each module includes 8S cells. There is no BMS protection function in the battery tray and the BMS protection is integrated into the specified end system, so the battery tray has to be used together with the specified end system (model no. ELSR722-00004 or model no. ELSR103-00001).
2. The final evaluation of the battery tray must be conducted in the end product for which the battery tray will be used.

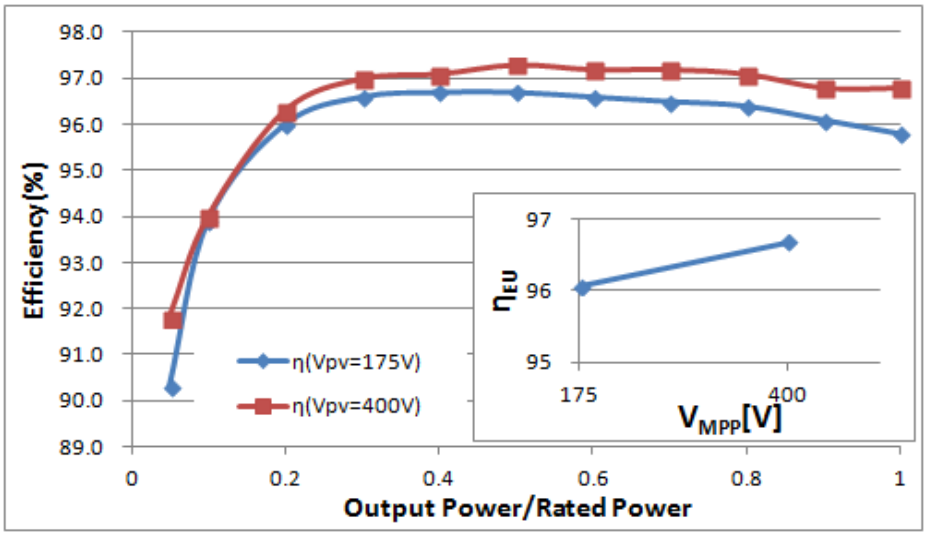
[Table 11-1: Technical specifications]



[Figure 11-1: Derating Curve]



[Figure 11-2: Power efficiency curve of System]



[Figure 11-3: Power efficiency curve of PV Generation]

12.Disassembly

12.1 Disassembly

CAUTION

Risk of injury due to the heavy weight of the Scalable All in One!
Make sure to have at least two persons move this system.

CAUTION

Lethal hazards may be caused by high voltages in the Scalable All in One!

CAUTION

Lethal hazards may be caused by voltage spikes if the positive and negative terminal of the battery are shorted by conductive metals.
Stand by for 40 minutes to complete discharging in the system.

CAUTION

When transporting the All in One system with packaged type, remove the battery tray from the All in One system and transport them separately.

12.1.1 Removing Electric Connection

Push down the DC Isolator in the distribution box and the system.

Push down the AC circuit breaker in the distribution box.

Stand by for 40 minutes to complete discharging in the system.

Remove the AC connection terminal in the main body of the Scalable All in One.

Remove the PV connection terminal in the main body of the Scalable All in One.

Remove the communication cable from the Scalable All in One.

Remove the energy meter.

12.1.2 Disassembling the Main Body of Scalable All in One

Check to make sure that the communication connection line and the external electrical cable are removed from the battery and product

Check whether the DC Isolator is off

Remove the side cover of the enclosure as described in Chapter 5.2

Separate the battery tray from the system. Reverse order of the installation process.

Work with at least two persons (Overweight).

Unfasten the screw on the battery tray to remove it from the main body.

Pull the battery tray out to separate it from the main body.

Place the main body and the battery tray on the packing box. This process is the reverse order of the installation process.

12.2 Packaging

Make sure to pack the Scalable All in One in the original box.

If you have to pack in the box other than provided by Samsung SDI, consider the minimum weight of 105 kg.

The main body must go into the box completely.

12.3 Storage

Store Scalable All One at a temperature ranging from -20 to 60℃.

12.4 Disposal

If the battery or the product life has expired, the regulations for the disposal of electronic products in that region must be followed, and if it is not possible, send them to Samsung SDI. The address is indicated in the contact information (Chapter 13).

13.Contact

■ Address: AWR GROUP, Unit 2 / 8 Moorlands Road, INGLEBURN, NSW 2565

AUSTRALIA

1300-377726 (1300-ESS SAMSUNG)

■ E-Mail: essausvc@samsung.com

For technical problems or inquiries for use, please contact the installation company.

To receive customer support, the following information is required.

1. Product type: ELSR722-00004 or ELSR103-00001
2. Serial Number:
3. PV module type and configuration
4. Option equipment: Energy Meter Part Name

www.samsungsdi.com

SAMSUNG SDI

R50A8Z1150917I10EC

Australia (Eng.) 09/2015. Rev 1.0